THE

AGRICULTURAL ADVISORY DEPARTMENT

IMPERIAL COLLEGE OF TROPICAL AGRICULTURE.

IMPERIAL MYCOLOGICAL
25 OCT 1937
INSTITUTE

REPORT

ON THE

Agricultural Department

ANTIGUA

1936.

ISSUED BY

THE COMMISSIONER OF AGRICULTURE

1937.

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LETTER OF TRANSMITTAL.

GAJ/JF.

25th May, 1937.

C.A. 607/37.

Sir,

I have the honour to transmit the Annual Report of the Agricultural Department, Antigua, for the year 1936.

2. The total value of the chief products of agriculture and livestock exported during 1936 amounted to £199,443 compared with £159,770 for 1935 and £188,034 for 1934.

3. The values of sugar products exported during the last 3 years were as follows:—

1936—£187,559 or 94% of the total exports
1935—£156,220 or 97% of the total exports
1934—£186,712 or 99% of the total exports

4. The increase in the value of Sea Island cotton exported from £480 in 1934 to £2,062 in 1935 and close on £9,000 in 1936 is due mainly to increased production and to some extent to an improvement in prices.

5. The exports of lime oil, the only other considerable agricultural product produced in Antigua, increased in quantity and value from 40 gallons valued at £395 in 1934 to 56 gallons valued at £448 in 1935 to 248 gallons valued at £1,762 in 1936.

6. The Report gives a summary of the work undertaken by the Department in connection with the sugar cane crop. The Department is rapidly becoming a clearing house of information for this industry. The ultimate aim is to be in a position to advise growers regarding the most suitable cane variety, cultural and manurial treatment etc. for each soil type. This involves a great deal of team work between the planters and the scientific workers.

7. The soil survey work started by Professor Hardy some years ago and developed with great skill and industry by Mr. C. F. Charter, Agronomist to the Gunthorpe and other estates, deserves to be specially mentioned. The experimental work carried on by the Department and by Mr. Charter and directed by Mr. P. E. Turner under the auspices of the Sugar Cane Investigation Committee is rapidly accumulating information of the greatest value to the industry.

8. The work of Mr. H. E. Box, Entomologist, in endeavouring to effect control of the sugar cane moth borer by the introduction of parasites is proving to be more difficult than was at one time anticipated. Whilst satisfactory control has been effected by the introduction of Lixophaga to St. Kitts and the Amazon fly to St. Lucia peculiar conditions obtain in Antigua which make it necessary to continue the investigation. It is therefore fortunate that Mr. Box's services have been secured for a further period of two years during which time he will be able to devote his undivided attention to this peculiar Antigua problem.

9. It is obvious from the Report that whilst the efforts of the officers of the Department have been largely directed towards the improvement of the main industry of the Island at the same time attention has been paid to the various other agricultural activities of the Presidency. The important subsidiary Sea Island cotton industry calls for a great deal of close attention. Questions of pure seed supply, enforcing of close season and close planting regulations, stocking of insecticides for control of pests, etc., require detailed supervision.

10. The Agricultural Superintendent continues to report progress in connection with the work of land settlement on the three Government land settlement schemes. As an indication of the progress made the following figures of sugar cane sales in tons are abstracted from the Report.

	1932	1933	1934	1935	1936
Greencastle	253	1,426	1,869	1,465	2,831
Matthews	152	498	876	766	1,173
Jonas's	....	....	162	485	1,123
Totals	405	1,924	2,907	2,716	5,127

Up to the present the Department has assumed responsibility for the supplying of suitable cane varieties, artificial manures, payment of the individual allottee for produce supplied to the factories collectively, etc.

11. The time has now arrived to set up some organisation to take over the duties now performed by the agricultural officers so that at the close of the ten year period during which the allottees are under the control and guidance of the agricultural department there will be no sudden break of continuity.

12. During the year a most important step was taken by Government in the setting up of a separate branch of the agricultural department to further peasant agriculture with special reference to cane farming and cotton industries and also to vegetable cultivation for home consumption and for winter export to Canada etc. At present peasants in Antigua supply the factories with about 20% of the total cane produced. When it is realised that a very considerable percentage of the land in Antigua is in the hands of small cultivators there is ample room for development in this direction. Furthermore, there is at present a very definite demand for more Sea Island cotton, a crop well suited to peasant production in Antigua.

I have the honour to be,

Sir,

Your obedient servant,

G. A. JONES,

Commissioner of Agriculture.

His Honour,

The Administrator,

ANTIGUA, B.W.I.

REPORT ON THE AGRICULTURAL DEPARTMENT, ANTIGUA, FOR THE YEAR 1936.

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Report on the Agricultural Department, Antigua.

For the Period January to December, 1936.

PART I.

SECTION I. GENERAL AGRICULTURE.

Weather Conditions.

The average rainfall for 1936 amounted to 59.99 inches which is 16.37 inches above the average rainfall based on the past 63 years.

The prospects for the 1937 sugar crop were excellent at the end of 1936, the estimate being about 27,000—28,000 tons.

The heavy rains however, especially towards the end of December were excessive for cotton and the prospects for this crop were that yield per acre would be much lower than was the case with respect to the 1935-36 crop.

Chief Crops.

(*A*) *Sugar.* The average rainfall in 1935 was 38.31 inches—3.55 inches less than in 1934, but the distribution was favourable and the crop reaped in 1936 was larger than the 1935 crop amounting to 20,886 tons grey crystals and 300 tons muscovado. The average price realised for the grey crystals exported was £9. 2. 5. per ton.

The average yield of cane per acre was 16.3 tons as compared with 15 tons in 1935, 15.2 tons in 1934 and 20.1 tons in 1933.

The moth borer (*Diatraea saccharalis*) has continued to be the major pest of sugar cane. The Amazon fly (*Metagonistylum minense*) the experimental introduction of which was recorded in the 1935 report failed to become established and arrangements were made for Mr. H. E. Box, F.E.S., who had been responsible for the earlier investigation on the ecology and control of the borer in Antigua as well as for the trial of the Amazon fly, to return to the island and continue the investigation.

As mentioned in the last report, the white grub (*Lachnosterna antiguae*) has continued to cause damage in many fields especially to recently germinated canes.

Root disease has continued to be the chief disease of sugar cane, and is common in most fields where soil or climatic conditions are unfavourable. During 1936 drought was seldom a factor of importance but impeded drainage has been responsible for damage in some districts. With the tendency for a more suitable allocation of cane varieties in the last planting season there are indications of a reduction in the severity of this trouble.

Gumming disease has continued to be common in fields of Ba.11569, but the prevalence of leaf symptoms of this malady does not appear to affect the juice qualities or the yield of this cane, which at present is the nearest approach to a 'general purposes' variety for Antigua conditions.

An important step taken in 1936 was the granting of a loan from the Colonial Development Fund for extensions of the railway systems of the two factories. These extensions will be of great assistance especially to peasants who cultivate the greater portion of the land in the districts to be served and who at present are faced with excessive transportation costs.

(*B*) *Cotton.* The 1936 crop was reaped from 612 acres: the total production was 113,180 lb. clean lint and 4,598 lb. stains. The crop was sold at prices varying from 1/5½—1/10 per lb. for clean lint.

The area planted for the 1936—1937 crop was about 950 acres. Germination was fair, but most fields suffered badly from the heavy rains early in November and in the latter half of December, while the cotton caterpillar (*Alabama argillacea*) did much damage in some districts.

The prospects for the 1937 crop were poor at the end of December. Despite the increase of over 60% in the area reaped it was improbable that there would be any increase in production.

Antigua Cotton Growers Association.

Peasants cotton was again purchased at the Antigua Cotton Factory on behalf of the association, 81,373 lb. being bought at 2½d. per lb. followed by a payment on resale of the cotton at the rate of 1¾d. per lb., this being a bonus equivalent to rather more than 75% of the profits.

The Antigua Cotton Growers Association continued its membership of the West Indian Sea Island Cotton Association and was represented at the meeting held in St. Kitts by Mr. E. Dew.

Development of Peasant Agriculture.

During 1936 a separate branch of the Agricultural Department was established to further peasant agricultural industries with special reference to the existing cotton industry and also to vegetable cultivation, both for local consumption and for a winter export trade.

Mr. C. A. Gomez, Curator Department of Agriculture, Montserrat, has been seconded for this work and assumed his duties in Antigua in May 1936.

Agricultural Exports.

The following table shows the chief agricultural products exported during the years 1934, 1935 and 1936:—

Article.	1934.		1935.		1936	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
		£		£		£
Sugar (Crystals)	19,505 tons	182,096	16,072 tons	151,249	19,759 tons	180,240
Sugar (Muscovado)	....	....	100 „	800	100 „	1,053
Molasses (V. Pan)	808,459 gals.	2,515	324,562 gals.	2,188	536,177 gals.	3,351
Molasses (Muscovado and Fancy Syrup)	32,715 „	1,968	33,802 „	1,690	44,955 „	1,980
Rum	851 „	133	2,008 „	293	6,425 „	935
Cotton Lint	9,600 lb.	480	32,950 lb.	2,062	117,380 lb.	8,988
Lime Juice (raw)	3,712 gals.	142	6,916 gals.	305	6,106 gals.	154
Green Limes	97 brls.	85	77 brls.	57	94 crts.	13
Lime Oil	40 gals.	395	56 gals.	448	248 gals.	1,762
Tamarinds	152 brls.	93	461 brls.	295	522 brls.	522
Tomatoes	....	....	....	....	147 crts.	30
Hides and Skins	....	75	....	204	....	232
Coconuts	400	2	2,300	9	20,399	72
Onions	10 crts.	6	....	....	75 crts.	25
Horses	2	25	8	96	6	80
Asses	6	7	16	64	1	6
Mules	1	12	1	10	....	....

SECTION II. WORK OF THE DEPARTMENT OF AGRICULTURE.

PLANT IMPORTATIONS.

During the year the following plants and seeds were imported :—

Plants or Cuttings.

Himalyan Berry (Rubus Species)	2	plants per A. K. Petrie-Hay, Esq.
Cane Cuttings :—		
B.2931	4	from Plant Quarantine Station.
B.2977	3	Trinidad.
B.3011	3	„
B.3013	2	„
B.3124	4	„
B.3125	4	„
B.3127	3	„
B.3128	3	„
B.3179	2	„
B.3216	3	„
B.3234	3	„
B.3439	3	„
Co.290	3	„
C.P.807	3	„
Fiji	3	„
Groen Duitsch N.G. ..	3	„
M.28	4	„
M.63	3	„
N.G.251	3	„
N.G.24	3	„
P.O.J.2883	3	„
P.R.803	3	„

Seeds.

Cotton Seed	100 lb.	from Montserrat.
Onion Seed	32 lb.	from Teneriffe.
Cauliflower Seed (Early Patna)	12 ozs.	from India through the Commissioner of Agriculture.
Other vegetable seeds	29 lb.	from U.S.A.
Grass seed	10 lb.	from U.S.A.
Flower seeds	5 ozs.	from U.S.A.
Papaw seeds		from Trinidad.
Australian wattle (Acacia decurrens)		from Australia per Miss B. Harper.
Passiflora edulis		„

PLANT AND SEED DISTRIBUTION.

The following plants and seeds were distributed during the period under review :—

* Cane Cuttings	41,060
Onion Seedlings	27,025
Tomato Seedlings	2,250
Budded Oranges	58
Budded Limes	6
„ Tangerine	6
„ Mango	15
„ Avocado Pear	8

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* B.H.10.12	20,150
B.2935	11,366
B.726	9,430
P.O.J.2878	62
B.891	40
B.3013	12
	41,060

Bread Fruit	69	
Eucalyptus	41	
Flamboyant	11	
Mahogany	41	
White Wood	6	
Gliricidia	272	
Cassia	130	
Casuarina	136	
Bougainvillea	31	
Croton	25	
Miscellaneous fruit Trees	43	
„ forest „	22	
„ ornamentals	77	
Onion Seed	31	lb.
Grass Seed	10	lb.
Cauliflower Seed	8	oz.
Other Vegetable Seeds	26	lb.
Flower Seeds	4	oz.

WORK AT GREENCASTLE EXPERIMENT STATION.

NURSERY WORK.

A. *Sugar Cane.*

The following varieties were grown as plant canes:—B.H.10.12, Ba.11569, B.374, B.726, B.891, B.2935, P.O.J.2878, B.119, F.C.916, F.C.988, M.3, M.7 and M.42 together with specimen plots of B.3922, B.147 (B.4507), B.4596, B.417, S.C.12.4, P.O.J.36, P.O.J.213, P.O.J.234, P.O.J.2714, P.O.J.2725, P.O.J.2727, Co.213, Co.221 and Co.281.

B.374, B.726, B.891, B.2935, P.O.J.2878, G.119, F.C.916, F.C.988, M.3, M.7 and M.42 were cultivated as first ratoons.

Among the newer varieties B.726 has again done particularly well both as a plant cane and as a first ratoon.

B.2935 again grew well as a plant cane but has been a failure as a ratoon. It should be noted that this variety while of great promise on the lighter and better drained soils is susceptible to root disease on heavy soils particularly as a ratoon. On such soils its extension is not recommended.

M.42 and F.C.916 appear to be well suited to the soils of the Bendals area. The results of a varietal experiment conducted at the experiment station in which these two canes were compared with B.H.10.12 and with F.C.988. M.3 and M.7 are given elsewhere in this report. The three last mentioned canes have not done well, either in this experiment or in the nursery plots.

New Varieties.

Cuttings of the following canes were received in March from the Plant Quarantine Station in Trinidad and were planted in a separate nursery for rapid propagation of the more promising varieties:—B.2931, B.2977, B.3011, B.3013, B.3124, B.3125, B.3127, B.3138, B.3234, B.3439, M.28, M.63, Fiji, N.G.251, N.G.24, C.P.807, P.R.803, Groen Duitch, P.O.J. 2883 and C.O 290.

Of the Barbados varieties advice has been received from the B.W.I. Central Cane Breeding Station that the following are recommended for trials in the British West Indies :—B.3013, B.3124, B.3127. These will be extended as rapidly as is possible and so too with B.3439.

M.28 one of the Mayaguez seedlings has a good reputation in Porto Rico. Co.290 is reputed to be one of the best of the Coimbatoire seedlings, comparatively thick, early maturing and of good juice quality. These two varieties will also be extended rapidly. The remaining varieties will be retained for the time in small observation plots.

B. *Fruit and Vegetables.*

Citrus Fruit. The following citrus fruit plants were propagated during the year 1936 :—

Archbishop Orange	27
Washington Navel Orange	35
Mandarin Orange	10
Tangerine	16
Marsh Grape Fruit	10
Budded Limes	15
	113

Mangoes. Better results were obtained with mangoes than had been the case in 1935. The following varieties were propagated :—

Julie	126
Bombay	18
Gordon	6
	150

Avocado Pears. 25 plants were propagated all of the variety Pollock.

Bread Fruit. One hundred and twenty plants were raised from root cuttings.

Onions. Several thousand onion slips were raised.

Yams and Eddoes. Nursery plots were grown of the following varieties :—

Yams—Seal top, Bugle Horn, Cush Cush, Light Red, Lisbon and Crop.

Eddoes—Tannia Eddoe, Tannia Yellow, Tannia White, Tannia Roliza, Tannia Priete and Tannia Roliza White.

FRUIT PLOT

Citrus. All citrus plots made good growth during the season under review. In February 1936 all trees received 1 lb. sulphate of Potash and four buckets of vegetable compost, and were then mulched with cane trash and other decaying organic matter.

A fair crop was reaped during the latter part of 1936 the fruit as a rule being of good quality.

Considerable improvement was observed in the case of the small plot of Marsh's Seedless Grape Fruit, as a result of the establishment of a wind break and of the unusually wet season.

The opinion expressed in previous reports that citrus fruit can be grown in the Bendals district provided certain conditions are fulfilled is further confirmed by the experience of the season under review. The necessary conditions are :—

(i) Selection of a site protected from the wind of which citrus fruits trees are particularly intolerant.

(ii) Thorough mulching with trash or other organic matter at the beginning of the dry season.

(iii) Spraying with 3 per cent Sulphemulsol solution whenever scale insects are prevalent. In the dry season a thorough spraying every three or four weeks is required.

Mangoes. The mango trees made good growth during 1936, but the crop was a small one although of good quality. The trees set fruit heavily but failed to carry the fruit during the dry weather experienced in April and early May.

Orchard. The trees planted in the orchard made fair progress during the year. The avocado and citrus plots are now completed but the mango plots are still being extended.

II. EXPERIMENTAL WORK.

A. Sugar Cane.

For convenience the experiments conducted with sugar cane at the Experiment Station are included in the section on sugar cane experiments which

deals with field experiments conducted by the department in various parts of the island.

B. Sweet Potatoes.

The varietal trial planted in October 1935 was reaped in August 1936. The layout was a six by six Latin Square, the individual plots being each 1/70 acres in area.

The following table shows the mean yields expressed as tons per acre :—

Variety	*Yield per Acre*
V.52	9.25
Bert	8.80
Brook's Seedling	8.65
White Gilkes	7.90
Red Nut	7.30
Moore	7.10

Differences will not exceed 1.3 tons per acre by chance more often than once in 20 times. V.52 is significantly better than White Gilkes, Red Nut and Moore. Bert which has done badly in previous trials has done well on this occasion. V.52 has headed the list for three years in succession and can be recommended as a heavy yielder in the Bendals area.

No further varietal experiments are being conducted at present, but multiplication plots have been established for V.52, Brook's Seedling and White Gilkes, the latter variety being included on account of its excellent appearance and fair quality.

MODEL ALLOTMENT.

The report on the model allotment covers the period October 1st 1935 to September 30th 1936. The statement of annual expenditure and revenue for the various plot units is not included in this report but may be consulted at the office of the Agricultural Department. The statement of revenue and expenditure in connection with the individual crops is shown in Table A.

The total expenditure during the period under review amounted to £50. 12. 10., and the total revenue to £67. 9. 10., there being a profit of £16. 17. 0.

The total expenditure since the laying down of the plots amounted to £257. 13. 2½. and the total revenue to £268. 19. 2. The adverse balance which was £5. 11. 0½. at the end of the 1934—35 season has thus been converted into a credit balance of £11. 5. 11½. If the fruit plot be considered apart from the remainder of the allotment, the latter now shows a credit balance of £29. 4. 10½.

It was hoped at the end of 1935 that a small profit would have been made on the fruit plot during the season 1935—36, but actually there was a loss of £1. 4. 11. Two factors were responsible for this loss, the small mango crop (more than half of the fruit set dropped during the very hot dry weather experienced early in May) and the fact that most of the guava trees were removed during the year and replaced by oranges. This change was made as it was found that the revenue from the sale of guavas was far too small for the area occupied by the trees.

The conclusions reached in previous years have in the main been confirmed. Sugar cane and sweet potatoes have proved profitable crops and small profits have been made with tomatoes and carrots on the vegetable plot, and with yams. Losses have been experienced with cassava, eddoes, onions, beet and cauliflowers.

As a result of five years working it can now be confidently stated that sugar cane and sweet potatoes are the most profitable crops for the locality, while profits may at times be made on vegetables, yams and cassava. Eddoes do not usually succeed while losses have invariably been experienced with onions, peas and beans.

In the last report consideration was given to the question of making allowance on the one hand for the cost of supervision and of the instalments

of the purchase price of the allotment, and on the other hand for the fact that the revenue should be credited with a sum equivalent to two days work a week by the holder (1/6 per diem) and with sundry small sums paid for marketing, reaping of vegetables etc., which would in many cases be done free of cost by members of the allottee's family. As both these figures are estimated at about £8 per annum, they may be disregarded and the statement of revenue and expenditure as presented here may be accepted as correct.

TABLE A.

Model Allotment.

TABLE OF CROP EXPENDITURE AND REVENUE.

Crop.	Plot.	Expenditure	Revenue	Profit	Loss
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
*Plant Canes	23—27	17 17 2½	21 10 9	3 13 6½	
First Ratoons	18—22	4 9 7	12 5 2	8 5 7	
2nd Ratoons	13—17	4 10 2	10 9 1	5 18 11	
Sweet Potatoes ..	10—12	3 2 11	5 13 10	2 10 11	
Cassava ..	9	1 18 10	1 0 0		18 10
Yams ..	8	17 11	1 0 8	2 9	
Eddoes ..	8	17 8	9 9		7 11
Vegetables ..	6 & 7	12 18 3	13 1 11	3 8	

ANALYSIS OF REVENUE AND EXPENDITURE. VEGETABLES.

	Tomatoes.	Cauli-flowers.	Onions.	Beet.	Carrots
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
General preparation and care ..	1 12 0	2 0	....	4 8	4 7
Beds	....	1 6	5 9	2 4	2 4
Manure and application ...	5 6	....	....	1 4	1 4
Insect control	8 6	5 1	4 5	5 0	....
Slips or Seeds and planting	10 6	12 0	3 5 8	6 6	9 9
Watering	10 0	14 6	4 4	15 0	15 0
Reaping and Transport	8 8	....	....	....	....
Total	3 15 2	1 15 1	4 0 2	1 14 10	1 13 0
Revenue	5 19 4	1 12 5	1 8 3	1 12 2	2 9 9
Profit	2 4 2	....	....	....	0 16 9
Loss	....	2 8	2 11 11	2 8	....

* Plant Cane with catch crop of tomatoes
Expenditure £18 16 7½.
Revenue £22 6 Profit £3 10 0½. Loss on catch crop 3/6.

COTTON SEED SELECTION.

The method followed in recent years of establishing a seed field on Thibous Estate with pedigree seed obtained from the Montserrat Agricultural Department, was again adopted in 1936. One hundred pounds of seed were imported during 1936: although the germination was good the yield as a result of the abnormally heavy rainfall was likely to be poor and in view of the prospect of a large increase in the cotton acreage for the 1937-38 crop it seemed improbable that the seed from the seed fields would plant more than about 25% of the total acreage. The remaining acreage would as far as possible be planted with the Thibous No. 2 type, i.e. the seed obtained from cotton grown at Thibous for the 1936-37 crop, not in the pedigree seed field but from seed from the preceding year's pedigree seed field.

By this system a fresh supply of pedigree seed is obtained annually for multiplication at Thibous and in the succeeding year the total acreage at Thibous, (except the new pedigree seed field) is planted with the seed from this cotton and in addition as large an acreage elsewhere as is possible. Up to the present the rest of the island's cotton acreage has been planted with Thibous seed one generation further removed from the Montserrat pedigree seed, but with the increasing cotton acreage it will become necessary to use some quantity of other seed unless the annual importation from Montserrat is increased and also the total Thibous cotton area.

The improvement in purity and in general quality resulting from the adoption of this system of seed selection has been maintained during the season under review.

Agricultural Education.

Monthly lectures to teachers in the primary schools were given by the agricultural superintendent, while the agricultural assistant on several occasions visited certain school gardens in the districts where it was considered conditions allowed of the pupils carrying out the advice given.

Statistics.

An economic survey of the Volcanic District of Antigua with special reference to peasant agriculture was conducted by the Agricultural Assistant.

During January 1936 the Agricultural Superintendent inspected the areas to be served by the proposed railway extensions and reported on the schemes with particular reference to their effect on peasant cane cultivators.

Correspondence.

During the year 134 minute papers were dealt with; 260 letters were received and 441 despatched.

Official Visits.

Visits were paid to the Experiment Station by the following:—

His Excellency the Governor Sir Gordon James Lethem, K.C.M.G., the Honourable J. D. Harford, Administrator of Antigua, Mr. G. A. Jones, Dip. Agric., Commissioner of Agriculture, Mr. C. C. Skeete, B.A., Assistant Commissioner of Agriculture and Mr. P. E. Turner, M.Sc., F.I.C., Adviser in Sugar Cane Experiments to the Commissioner of Agriculture.

Acknowledgments.

Thanks are due to the late Hon. A. E. Collins, F.I.C., F.C.S., Government Chemist for conducting analyses of cane juice and of manures in connection with the sugar cane experiments the results of which have been communicated in this report.

SECTION III. FINANCIAL STATEMENT AND STAFF OF THE DEPARTMENT.

FINANCIAL STATEMENT.

Head VII. Agriculture.	Expenditure.		Revenue.	
Salaries	1,422 18 2			
House Allowances	55 10 1			
Transport Allowances	212 6 11			
Greencastle & other experimental work	334 9 3			
Sugar Cane Experiments ..	99 18 11			
Planting and maintaining trees ..	23 6 2			
Fumigation of plants	4 2			
Printing reports and Contingencies	22 8 4			
Destruction of Wild Cotton and Okra plants	29 11 2			
Distribution of cotton seed ..	....			
Distribution of Paris Green ..	7 16 0			
Contribution to Central Cane Breeding Station	26 11 3			
Agricultural Survey	10 5 6			
Upkeep Botanic Station ..	16 12 10	2,261 18 9		
Revenue of Experiment Station ..	..	..	244 10 8	
Profit on Sale of Onion and vegetable seeds	..	..	2 6 3	
Sale of coconuts from Fort James	..	..	6 8	
Sale of Paris Green	..	..	7 2	247 10 9
Head XV Govt. Undertakings (2) Land Settlement.				
Land Officer's Department.				
Salary and Travelling	52 17 6	52 17 6		
Agricultural Development.				
Supervision	36 0 0			
Planting Material	8 8 10			
Drains and Roads	48 5 10			
Miscellaneous	9 19 0	102 13 8		
Payments for Land and Houses collected through Agric. Dept	..	..	408 3 5	408 3 5
Advance Accounts.				
Vegetable & Onion Seed account ..	23 16 8			
Fertilizer account	91 2 0			
Cultivation account	274 4 6	389 3 2		
Sale of Vegetable & Onion Seeds £26. 2. 11 less £2. 6. 3 transferred to revenue	..	..	23 16 8	
Fertilizer account	..	..	59 15 5	
Cultivation account	..	..	157 1 2	240 13 3
Total Expenditure and Receipts ..		£2,806 13 1		£896 7 5
Deposit A/c—Sale of Crops.				
Peasant cane payments	2,848 17 9			
Reaping costs	78 17 3			
Transfer to Revenue—Produce of Experiment Station ..	244 10 8			
Transfer to Revenue—Payments for Land and Houses ..	408 3 5			
Transfer to Fertilizer A/c ..	59 15 5			
Transfer to Cultivation A/c ..	146 11 11			
Balance in Deposit A/c ..	7 19 7	£3,794 16 0		
Receipt from sale of canes and other produce	..	..	£3,794 16 0	£3,794 16 0

STAFF OF THE DEPARTMENT.

Agricultural Superintendent ..	F. H. S. Warneford, M.A., B.Sc., A.I.C., F.C.S.
Agricultural Superintendent (Ag.)	L. L. de Verteuil, D.I.C.T.A.—May 1—Sept. 29.
Agricultural Assistant	L. L. de Verteuil, D.I.C.T.A.—Jany. 1—May 1; Sept. 29—Dec. 31.
Junior Assistant	V. G. Pereira.
Assistant Clerk (Office)	G. L. Bellot.
Asst. Clerk (Field)—Jan. 1—Oct 4	S. H. Abbott.
Asst. Clerk (Field)—Oct. 5—Dec. 31	C. K. G. Vieira.
Cotton Inspector—Jan. 1—Oct. 4	R. L. V. Hall.
Cotton Inspector—Oct. 4—Dec. 31—	S. H. Abbott.
Foreman Experiment Station ..	R. E. M. Whyte.

The Agricultural Superintendent was on vacation leave from May 1st to September 29th. The Agricultural Assistant was on vacation leave from January 1st to February 25th. Mr. S. H. Abbott was on vacation leave from February 10th to February 22nd. Mr. Vieira was on sick leave from December 7th to December 12th. The Foreman was on vacation leave from July 27th to August 12th.

SECTION IV. SUMMARY OF LEGISLATION AFFECTNG PLANTS, ANIMALS, PRODUCE ETC.

I. PLANT QUARANTINE.

I. External—Import Prohibitions.

The introduction of all plant material is regulated under the Plants Protection Ordinance, No. 16 of 1923, and cognate subordinate legislation.

The following schedules indicate those articles whose importation is absolutely prohibited and those whose importation is permitted only under licence granted by the Governor.

FIRST SCHEDULE.

ARTICLES ABSOLUTELY PROHIBITED.

Articles prohibited from importation	Countries from which importation prohibited.
(a) The Fruit of the Banana ..	All countries, except the other Islands of the Leeward Islands Colony and the United States of America.
(b) All other fruits except: (i) plantains. (ii) nuts. (iii) dried, canned, candied or other processed fruits.	Bahamas, Bermuda, British Guiana and all other countries except the British Isles, Canada, the British West Indies and the United States of America.
(c) All vegetables except: (i) onions. (ii) Irish potatoes. (iii) canned or processed vegetables.	ditto ditto
(d) Soil	Bahamas, Bermuda, British Guiana, Trinidad and all other countries except the British Isles, Canada, the other islands of the British West Indies not in this paragraph mentioned, and the United States of America.

SECOND SCHEDULE.

ARTICLES CONDITIONALLY PROHIBITED.

Articles prohibited from Importation	Conditions of prohibition	Countries from whence importation prohibited
(a) Sugar cane, Sugar cane seedlings and plants and all parts of the sugar cane.	Unless under licence granted by the Governor.	All countries.
(b) Banana plants and parts of banana plants.	ditto.	Bahamas, Bermuda, British Guiana, Central America, Dutch Guiana, and any island or place in the West Indies and the other islands of the Leeward Islands Colony.
(c) Rooted plants of the Citrus family.	Unless under licence granted by the Governor, and also unless accompanied by a certificate signed by a responsible inspecting officer stating that the district from which such plants originate has not been affected by, or has been free for the preceding two years, of Citrus Canker.	Cuba, Haiti, Jamaica, Santo Domingo, and the United States of America.
(d) Lime plants and parts of lime plants	Unless under licence granted by the Governor.	British Guiana, Dominica, Grenada, Montserrat, St. Kitts, St. Lucia and Trinidad.
(e) The fruit of the lime	Unless under Licence granted by the Governor.	Bahamas, Bermuda, British Guiana, Dominica Grenada, Montserrat, St. Kitts, St. Lucia, Trinidad, and all other countries except the other Islands of the British West Indies not in this paragraph mentioned, and the United States of America.
(f) Cotton seed, cotton lint and seed cotton and all packages, coverings, bags or other articles or things which have been used as packages, coverings or bags for cotton seed, cotton lint and seed cotton.	Unless under licence granted by the Governor	All countries.
(g) Sprouted coconuts	Unless under licence granted by the Governor.	Grenada, St. Lucia, St. Vincent and Trinidad.
(h) Soil and Plants growing in soil.	Unless under licence granted by the Governor after fumigation of such material.	All countries.
(i) All fruits except : (i) Plantains. (ii) Nuts. (iii) Dried, canned candied or other processed fruits.	Unless accompanied by certificate of origin from a responsible authority stating that such fruits were grown in the United States of America.	United States of America.

II. Internal—Control of Diseases and Pests within the Presidency.

(1) Plant Fumigation Ordinance No. 5, of 1905. This provides for the fumigation of plants imported into the presidency—at the discretion of the agricultural authority.

(2) Plant Protection Ordinance No. 16, of 1923. This is an ordinance for the prevention and eradication of diseases and pests affecting vegetation.

(3) The Cotton Protection Ordinance No. 7 of 1922, and the following Amendment Ordinances, Nos. 5 of 1926, 8 of 1927 and 14 of 1929, provide the necessary legislation for the enforcement of a close season for cotton and such other plants as may be specified by the Governor and empower the Governor to make regulations with respect to the control of ginneries, fumigation and disinfection of seed for planting, storage of cotton seed, etc., and disposal of cotton seed, seed cotton, etc.

Regulations made by the Governor in Council on 3rd May, 1922, under Section 13 of the Cotton Protection Ordinance, No. 7 of 1922, summarise the position with respect to these matters.

The Cotton Protection Regulations 1926 of March 22nd, 1926, extend the close season regulations to Okra plants.

A Proclamation dated 14th April 1924 under the Plant Protection Ordinance, No. 16 of 1923 proclaims Mosaic disease of Sugar cane to be a disease within the meaning of the Ordinance, and Regulations made on April 25th 1924, provide for notification by any owner or occupier of land who suspects the existence of Mosaic disease.

ANIMAL QUARANTINE.

I. External—Import Prohibitions.

The importation of all animals is regulated under the Diseases of Animals Ordinance No. 16 of 1913 as amended by Federal Act No. 10 of 1916 and Ordinance No. 8 of 1920, and by subordinate cognate legislation.

The following prohibitions were in force on December 31st 1936.

Prohibited Importations	Country of Origin	Reason.	Index of Legislation.
Cattle, sheep, pigs and goats, unless detained and isolated under official veterinary supervision for at least 14 days at the East India Dock Quarantine Station.	United Kingdom	Foot and Mouth Disease.	S. R. & O. 17 of 1929.
All animals unless accompanied by a veterinary certificate			S. R. & O. 20 of 1933.

II. Internal.—Control of Diseases and Pests within the Presidency.

(1) Swine Epidemic Act, No. 3 of 1893.

(2) Diseases of Animals Ordinance, No. 16 of 1913 as amended by Federal Act No. 10 of 1916 and Ordinance No. 8 of 1920.

This Ordinance empowers the appointment of an inspector, the slaughter of certain diseased animals, and provides for regulations for disinfection, disposal of dead animals, isolation of diseased animals, regulation of movement, etc.

Measure.	Object.	Index of Legislation.
1. *Protection.*		
(a) Turtle and Tortoises	Close Season	Ordinance No. 17 of 1927
(b) Wild Birds Protection	do.	„ No. 3 of 1913
(c) Cotton Traffic	Prevention of Larceny and regulation of local traffic in cotton.	„ No. 5 of 1906
(d) Produce Protection	Prevention of Praedial Larceny	„ No. 20 of 1922 „ No. 16 of 1926 Order in Council of 13th November 1922 S. R. & O. No. 11 of 1928
(e) Bush Fires ...	Protection of forest growth	Ordinance No. 5 of 1901 „ No. 24 of 1922
2. Crown Lands	Land Settlement	„ No. 5 of 1917 S. R. & O. No. 24 of 1930
3. Animals Tax	Revenue	Ordinance No. 10 of 1922 „ No. 5 of 1927 „ No. 20 of 1929 „ No. 10 of 1931
4. Cotton Planting ..	A close planting season during which while cotton may be growing, no cotton may be planted.	Ordinance No. 1 of 1931
5. Cotton Seed Control	To ensure the planting of seed of good quality ...	„ No. 10 of 1932
6. Cotton Export Levy Ordinance	To provide for a contribution to the West Indian Sea Island Cotton Association.	Ordinance No. 9 of 1933.
7. Cotton Export Ordinance ...	To make provision for the regulation of the quantity of cotton exported from the Presidency.	Ordinance No. 20 of 1934

APPENDIX I.

WORK IN CONNECTION WITH THE SUGAR CANE CROP.

I. Field Statistics.

A questionnaire similar to the one circulated during the previous year was again sent out by the agricultural department, with a view to obtaining definite information as to the acreages under different varieties, the yields per acre of these varieties, the manurial treatment of the fields, the methods of cultivation, the effect of time of planting etc.

The yield data obtained through this questionnaire are not recorded in this report, as the soils of Antigua are at present being more thoroughly classified than has been done in the past and it is proposed to make use of the 1936 data together with the 1937 crop data when the majority of the fields have been inspected and classified.

The data collected with respect to the crop planted for 1937 are recorded in this section.

1937 Crop.

Plant Canes for 1937. Acreages under different Varieties

Variety.	Acres	%of Reported Acreage.
B.H.10.12.	731.75	24.6
Ba.11569	979.75	33.0
B.147 (B.4507)	355.75	11.9
B.2935	270.75	9.1
P.O.J.2878	194.75	6.5
Mixed	155.00	5.3
B.726	92.50	3.1
Co.213	63.75	2.1
S.C.12.4	37.50	1.3
B.4596	31.50	1.2
B.6308	30.00	1.0
Miscellaneous	28.00	0.9
Total Acreage reported ..	2971.00	100.0

The following table shows the relative areas planted under the six following varieties, B.H.10.12, Ba.11569, B.147 (B.4507), P.O.J.2878, B.2935 and B.726 for the seasons 1934, 1935, 1936 and 1937.

	B.H.10.12	Ba.11569	B.147 (B.4507)	P.O.J.2878	B.2935	B.726
For 1934	37.2%	14.0%	26.0%	9.3%	—%	—%
„ 1935	43.6%	21.5%	9.9%	10.4%	—%	0.9%
„ 1936	35.7%	23.0%	8.6%	20.2%	0.8%	1.3%
„ 1937	24.6%	33.0%	11.9%	6.5%	9.1%	3.1%

The most noteworthy changes are :—

(1) The continued increase in the area under Ba.11569.

(2) The decrease in the areas under B.H.10.12 and P.O.J.2878.

(3) The rapid increase in the area under B.2935.

The decrease in the area under B.H.10.12 is due to a great extent to the substitution of Ba.11569 for B.H.10.12 on areas which owing chiefly to scanty rainfall are not really well suited to the latter variety. There has also been some substitution by B.726 in true B.H.10.12 areas.

The decrease in the area under P.O.J.2878 is probably well advised as this variety is not well suited to the average rainfall distribution of Antigua. There was a marked increase in the area of P.O.J.2878 for the 1936 crop and it is satisfactory to note the reverse tendency for 1937.

The new variety B.2935 does well on the well drained calcareous soils and on these soils its acreage can probably be extended with advantage. It is inadvisable to extend its cultivation on heavier soils as the evidence so far available indicates that it will not ratoon satisfactorily on such soils.

The following tables show respectively the manurial treatment given the fields prepared for the 1937 crop and the method of cultivation.

MANURIAL TREATMENT.

	Pen Manure	Filter Press Mud	Sheep Manure	Inorganic Fertilizer	No Manure	Total
Acres ..	2140.5	266.5	111.25	48.0	399.25	2971
% of Area Reported	72.1	9.0	3.8	1.6	13.5	100.0

METHOD OF CULTIVATION.

	Gyrotiller		Cattle Plough	Tractor		Total
	Flat	Banked with gyrotiller		Flat	Banked with Tractor	
Acres	543.25	262	1793.5	282.25	90	2971
% of Area reported	18.3	8.8	60.4	9.5	3.0	100.0

EXPERIMENTS WITH SUGAR CANE. *

I. SMALL SCALE EXPERIMENTS AT GREENCASTLE EXPERIMENT STATION.

A. Experiments with Sulphate of Ammonia on land receiving no pen manure.

Soil Type. Alluvial (Bendals clay).
Variety. B.2935.
Planted. Late Jan. 1935. Manured 10.4.35. Reaped 11.3.36.
Layout. Eight Randomised Blocks. Plot Area 1/240 acres.

Manurial Treatment per acre.	Yield of Cane Tons per acre.	Gain in Yield Tons per acre.
No manure	40.8	
5 cwt. S.A. applied on surface	44.0	+3.2
5 cwt. S.A. buried in circle around stools	42.9	+2.1

The increment due to Sulphate of Ammonia is not statistically significant.

B. Experiment with Nitrogen, Phosphorus and Potash in various combinations.

Soil Type. Alluvial (Bendals clay).
Variety. B.H.10.12.
Planted. Late Jany. 1935. Manured 18.4.35. Reaped 9.3.36.
Layout. Six Randomised Blocks. Plot Area 1/484 Acres.

Manurial Treatment per acre.	Yield Tons per acre	Gain in Yield Tons per acre
No manure	41	
S. A. 2 cwt.	43.3	+2.3
Super 2 cwt.	42.5	+1.5
K_2SO_4 2 cwt. each	43.6	+2.6
S. A. K_2SO_4 2 cwt. each ...	43.8	+2.8
S. A. Super 2 cwt. each ...	46.2	+5.2
Super K_2SO_4 2 cwt. each ...	46.2	+5.2
S. A. Super K_2SO_4 2 cwt. each...	52.2	+11.2

In the following tables the results are grouped so as to show the effects of Phosphate and of Potash on the increased yield due to nitrogen.

* These experiments form part of a comprehensive series of experiments conducted by this Department and by the agronomist of the Gunthorpes Estates under the direction of Mr. P. E. Turner, Adviser in Sugar Cane Experiments to the Commissioner of Agriculture and under the auspices of the Sugar Cane Investigation Committee of Antigua.

The complete results obtained to date have been published in *Tropical Agriculture*, Vol. XIV, Nos. 5 and 6, 1937.

YIELDS. TONS PER ACRE.

	Phosphate absent.	Phosphate present.
No S. A.	42.30	44.35
2 cwt. S. A.	44.75	48.00
Gain due to N.	2.45	3.65

YIELDS. TONS PER ACRE.

	Potash absent.	Potash present.
No S. A.	41.75	44.9
2 cwt. S. A.	43.55	49.2
Gain due to N.	1.80	4.3

It will be observed that the gain due to nitrogen in the presence of potash is very much greater than in the absence of potash.

This experiment was conducted in the vicinity of Bendals Factory in an area to which scum cake had without doubt been applied in the past so that it may be assumed that the phosphate content of the soil was unusually high.

The average gains in yield due to Nitrogen, Phosphate and Potash are 3.05 2.70 and 4.36 tons per acre respectively and are all significant.

C. Experiment with a complete Inorganic Fertilizer.

Soil Type. Alluvial (Bendals Clay)
Variety. B.726.
Planted. 26/1/35. Manured 26/4/35. Reaped 6/4/36.
Layout. 4 Randomised Blocks. Plot Area 1/161 acres.

Manurial Treatment per acre.	Yield of plant cane, Tons per acre.	Gain in Yield, Tons per acre.
Nil	33.62	....
2 cwt. S/A, 2 cwt. Super, 2 cwt. K_2SO_4 ...	40.21	6.59

II. VARIETAL EXPERIMENTS.

A. *Experiments with plant canes.*

Variety Trial. Sandersons, No. 27.
Soil Type. Non calcareous clay tuff (Gunthorpes clay).
Planted 7-9/11/34. Reaped 5 and 6/3/36.

Rainfall.		Average rainfall for similar period based on returns for 10 years.	
Nov. and Dec., 1934	20.36 ins.	November and December	11.74 ins.
1935	41.58 „	January—December	47.98 „
Jan.—Feb. 1936	3.69 „	January—February	3.75 „
Total	65.63 „	Total	63.47 „

Layout. 1—6 x 6 Latin Square. Plot Size 1/30.3 Acres.

Variety.	Yield. Tons cane per acre.	Yield. Tons Sugar per acre	Sucrose in Juice. lb. per gallon.
B.726	28.24	4.59	2.430
B.H.10.12	26.09	4.21	2.389
Ba.11569	27.32	4.01	2.178
S.C.12.4	24.00	3.11	2.115
P.O.J. 2878 ..	22.71	3.35	2.198
B.6308	21.31	2.93	2.038

Differences in yield of canes per acre exceeding 2.48 tons might be due to chance less than once in 20 times, and differences exceeding 3.39 tons less than once in 100 times. The corresponding figures for differences in tons sugar per acre are 0.42 and 0.57 tons.

All the varieties with the exception of Ba.11569 and B.6308 germinated well and although the latter was successfully established by March 1935 up to the end of May Ba.11569 showed only 82% germination. Notwithstanding this fact Ba.11569 filled the second place with respect to tons cane per acre, the yield being only 1 ton less than that of the leading cane.

Variety Trial. Jolly Hill. Woodside Piece.

Soil Type. Alluvial (Yorke's clay).

Planted. B.147e. 26/10/34, remainder 12/12/34 except B.2935, 17/1/36.

Reaped. 1 and 2/4/36.

Rainfall.		Average rainfall for similar period based on returns for 10 years.	
Nov. and Dec. 1934	15.79 ins.	November—December	9.52 ins.
1935	33.47 „	January—December	43.25 „
Jan. — March 1936	4.11 „	January—March	5.67 „
Total	53.37 „	Total	58.44 „

Layout. Four Randomised Blocks. Plot Size 1/28.5 Acres.

Variety.	Yield. Tons cane per acre.	Yield. Tons Sugar per acre.	Sucrose in Juice. lb. per gallon.
P.O.J. 2878	34.94	4.51	1.922
B.H.10.12	31.44	4.87	2.326
B.2935	28.16	3.98	2.110
S.C.12.4	27.88	3.94	2.108
B.6308	26.67	3.40	1.900
B.726	25.09	3.93	2.350
B.4507e (B147) ..	21.70	2.88	1.976
B.4507 (B147)	14.58	1.94	1.980

Differences in yield of canes per acre exceeding 3.56 tons might be due to chance less than once in 20 times and differences exceeding 4.84 tons less than once in 100 times. The corresponding figures for differences in tons sugar per acre are 0.50 and 0.68 tons respectively.

Germination was good in the case of P.O.J.2878, B.H.10.12, B.6308, B.726 and B.4507e. It was fair in the case of S.C.12.4 and poor in the case

of B.4507. Ba11569 was planted in the experiment, but at the time of first supplying the germination was so poor—2%—that it was replaced by B.2935.

B.4507 appears to be unsuited to this low lying wet heavy soil. The early plots of this variety made an excellent start but by February 1935 many of the stools were wilting and showing evidence of root disease.

P.O.J.2878 and B.H.10.12 are the two outstanding varieties.

Variety Trial. Parham New Work. No. 19.
Soil Type. Lagoon clay.
Planted. B.4507e. 19/10/34, remainder 13/12/34.
Reaped. 14 & 15/4/36.

Rainfall.			Average rainfall for similar period based on returns for 10 years.		
Nov. and Dec., 1934	....	20.13 ins.	November—December	....	8.83 ins.
1935	....	36.73 „	January—December	....	42.18 „
Jan.—March, 1936	....	3.46 „	January—March	....	4.75 „
Total	....	60.32 „	Total	....	55.76 „

Layout. Four Randomised Blocks. Plot Size. 1/28.4 Acres.

Variety.	Yield. Tons cane per acre.	Yield. Tons Sugar per acre.	Sucrose in Juice. lb. per gallon.
B.2935	32.06	4.80	2.226
G.119	27.52	4.10	2.221
P.O.J.2878	27.37	4.35	2.387
B.891	27.17	4.48	2.463
B.726	26.52	4.53	2.565
B.H.10.12	26.49	4.50	2.551
B.4507 (B147)	23.27	3.50	2.240
S.C.12.4	21.79	3.49	2.381
B.4507e (B147)	21.20	3.22	2.257

Differences in yield of cane per acre exceeding 3.41 tons might be due to chance less than once in twenty times and differences exceeding 4.62 tons less than once in 100 times.

Germination was good in the case of P.O.J.2878, B.4507, B.891 and B.2935. B.4507 was treated with saturated lime water for 48 hours before planting and these plots were actually established before those of B.4507e. which did not receive this treatment and which gave a poor germination. Poor initial germinations were obtained also with B.H.10.12, G.119 and S.C.12.4. The germination of B.726 was moderately good.

B.2935 is definitely superior to the other varieties.

Variety Trial. Greencastle Experiment Station.
Soil Type. Alluvial (Bendals clay).
Planted. 5—7/11/34. Reaped. 19 and 20/3/36.

Rainfall.			Average rainfall for similar period based on returns for 10 years.		
Nov. and Dec., 1934	....	11.78 ins.	November—December	....	10.84 ins.
1935	....	48.12 „	January—December	....	50.23 „
Jan.—Feb., 1936	....	3.72 „	January—February	....	4.17 „
Total	....	69.62 „	Total	....	65.24 „

Layout. One 6 x 6 Latin Square. Plot Size. 1/37.3 Acres.

Variety.	Yield. Tons per Acre.
F.C.916	27.2
M.42	25.4
B.H.10.12	24.7
M.7	19.6
M.3	16.4
F.C.988	12.7

Differences in yield exceeding 4.23 tons and 5.78 tons per acre might be due to chance less than once in 20 and once in 100 times respectively.

Germination was excellent and the early growth of all varieties was healthy and vigorous. About April 1936 F.C.988, M.3 and M.7 were observed to be inferior to the other varieties. F.C.916 and M.42 appear to be possible competitors of B.H.10.12 in the Bendals area.

B. Experiments with ratoon canes.

Variety Trial. Thibous. Big Piece.
Soil Type. Calcareous marl, (Fitches clay), deep phase.
Planted. 20/12/33.
Reaped as plant cane 28/2/35; as 1st ratoons 12/3/36.
Rainfall as 1st ratoons 41 ins.

Layout. Five randomised blocks as plant canes but four randomised blocks as ratoons one block having been reaped by the estate.

Variety.	Yield of cane Tons per acre 1st ratoons	Yield of cane Tons per acre plant cane	Total Yield
Ba.11569	25.26	17.17	42.43
B.2935	24.31	16.10	40.41
P.O.J.2878	22.76	13.11	35.87
S.C.12.4	16.34	10.65	26.99
B.147 (B.4507)	17.87	7.73	25.60

Differences in yield of the ratoon crop exceeding 4.47 tons and 6.26 tons per acre might be due to chance less than once in 20 and once in 100 times respectively.

Differences in total yield exceeding 10.44 tons might be due to chance less than once in 20 times.

In this experiment B.147 (B.4507) was planted too late to give it a fair chance.

Variety Trial. Collins. No. 8.
Soil Type. Calcareous marl (Fitches clay), deep phase.
Reaped as plant cane 12/3/35. Reaped as 1st ratoons 24/4/36.
Rainfall as 1st ratoons 40 ins.
Layout. Four randomised blocks.

Variety.	Yield of cane Tons per acre 1st ratoons.	Yield of cane Tons per acre plant cane.	Total Yield.
B.2935	20.47	28.59	49.06
Ba.11569	20.20	28.08	48.28
B.H.10.12	16.76	26.30	43.06
B.147 (B.4507)	19.79	22.28	42.07
P.O.J.2878	14.56	25.24	39.80
B.726	15.59	22.11	37.70
S.C.12.4.	13.74	22.54	36.28

As a first ratoon differences in yield exceeding 2.33 and 3.19 tons might be due to chance less than once in 100 times respectively. Differences in total yield exceeding 6.06 tons and 8.29 tons might be due to chance less than once in 20 times and once in 100 times respectively.

B.2935 and Ba.11569 are outstanding both as plants and as ratoons. Both are superior to B.H.10.12 as ratoons. As a ratoon B.147 (B.4507) was equal to B.2935 and Ba.11569; its low yield as a plant cane may have been due to the late time of planting. P.O.J.2878, B.726 and S.C.12.4. are definitely inferior to the other varieties.

Variety Trial. Paynters No. 16.

Soil Type. Non-calcareous clay tuff (Tomlinson's clay).

Planted. 9/1/34.

Reaped as plant cane 21/3/36. Reaped as ratoons 23/4/36.

Layout. Four randomised blocks.

Variety	Yield of cane Tons per acre 1st ratoons.	Yield of cane Tons per acre plant cane.	Total Yield.
B.2935	9.11	32.96	42.07
P.O.J.2878	12.01	29.70	41.71
Ba.11569	9.89	30.48	40.37
S.C.12.4	9.54	29.37	38.91
B.H.10.12	9.65	26.95	36.60
B.726	9.23	26.30	35.53
B.147 (B.4507)	8.22	25.25	33.47

As first ratoons differences in yield exceeding 1.87 tons and 2.57 tons per acre might be due to chance less than once in 20 times and once in 100 times respectively. The corresponding figures for differences in total yield are 5.23 and 7.17 tons.

The following general comments on the experimental results and on the varieties under comparison may be of interest.

Ba.11569 has done well both as a plant cane and as a ratoon at Thibous and at Collins. It has done well as a plant cane at Sandersons, despite difficulty of establishment and at Paynters. At the latter station it ratooned badly but so did most other varieties.

B.2935 has done well both as a plant and as a first ratoon at Thibous and at Collins. It did well as a plant cane at Paynters but failed as a ratoon. In the 1934–36 experiments it has done well as a plant cane on lagoon clay at Parham New Work but has done only moderately well on the alluvial soil at Jolly Hill.

B.147 (B.4507) has done well as a ratoon at Collins, but has not done very well on the same soil type at Thibous—possibly owing to poor establishment during the plant cane crop. As a plant cane it did not do well at either station probably owing to late planting.

It has given poor results as plant cane on alluvial soil at Jolly Hill and on lagoon clay at Parham New Work even when planted early.

B.H.10.12. has done well at Jolly Hill as plant cane and moderately well at Sandersons.

B.726 has done well at Sandersons as a plant cane but rather poorly at Jolly Hill. It has failed at Paynters.

P.O.J 2878 has done well as a plant cane at Jolly Hill and has ratooned relatively well on the non fertile tuff at Paynters.

The general position as regards the varieties may be summarised as follows.

Ba.11569 both as a plant cane and as a ratoon does well on most types of soil in Antigua and of the established varieties is the nearest approach to a general purposes cane. It is a quick growing variety and stands drought well. Its juice qualities are moderately good. At times its germination is indifferent.

B.2935 is a possible competitor of Ba.11569 on the well drained calcareous marl soils. There are indications that while it will do well as plant cane on heavier soils, it is intolerant of poor drainage and will fail as a ratoon on such soils. Its juice qualities are only moderately good. It is usually a ready germinator.

B.147 (B.4507) has long had a reputation as a good cane for the lighter calcareous marl soils. It ratoons well and is drought resistant: it is intolerant of poorly drained soils and must be established early. The germination of this variety is excellent if the cuttings are soaked for 48 hours in saturated lime water: otherwise germination may be indifferent unless soil moisture conditions are especially favourable.

B.H.10.12 does well on the alluvial soils and on the calcareous marls, calcareous clay tuffs and the more fertile Ottos clay soils under conditions of fair rainfall. It is intolerant of poor drainage and dry situations. For the latter reason it is not generally suited to the calcareous marls of the East and North East districts.

B.726 is a possible competitor with B.H.10.12 on some of the soil types suited to the latter. It is well suited to the alluvial soils of the Bendals area and although it has not done well at Jolly Hill in the experiment reaped in 1936 it has done well there in the case of experiments reaped in previous years.

P.O.J. 2878 appears to be well suited to the alluvial soils of the Bendals and Jolly Hill areas. This variety has done well in most parts of Antigua in years of exceptionally high and well distributed rainfall but in normal years it is suited only to the wetter districts or to soils whose topographical situation renders them wet soils. It is a very easy cane to establish and makes rapid early growth but requires a plentiful supply of moisture throughout the growing period to give good yields. The percentage sucrose in the juice is fairly high but the juice possesses certain undesirable qualities which render this cane poor from the factory point of view.

S.C.12.4 is not well suited to most soils in Antigua.

B.6308 is definitely inferior both from field and factory points of view.

III. MANURIAL EXPERIMENTS.

A. Experiments with Pen Manure versus Sulphate of Ammonia and Pen Manure versus Sulphate of Ammonia and a complete inorganic fertilizer.

Estate. Pares & Cochranes. Field No. 10 Cochranes.
Soil Type. Calcareous marl. (Fitches Clay). $CaCO_3$ 13%.
Variety. B.H.10.12. Plant canes.
Method of cultivation. Close ploughed Sept. 1934; banked with fork Oct. 1934. Cross holed.

Date of planting. 4/1/35. Date of reaping. 26/2/36.
Rainfall during growing period (13¾ months) 38 ins.
Layout. Two 5 x 5 Latin Squares. Plot Area. 1/40 acre.

Manurial Treatment per acre.	Yield of cane Tons per acre	Gain Tons per acre
Nil	26.21	
12 tons pen manure 22/12/34..	29..35	+3.14
24 tons pen manure 22/12/34	31.38	+5.17
36 tons pen manure 22/12/34..	31.53	+5.32
2 cwt S/A. 29/5/35 2 cwt S/A/.. 9/8/35	25.90	—0.31

The gain due to pen manure is significant and might be due to chance less than once in 100 times.

The effect of Sulphate of Ammonia is not significant on this calcareous soil.

Estate. Gaynors. Field Elms No. 11.
Soil Type. Calcareous marl; (Fitches clay), deep phase. $CaCO_3$ 50%.
Variety. Ba.11569. Plant cane and 1st ratoons.
Planted. 8/2/34. Reaped 16/11/35 as plants; 13/4/36 as 1st ratoons.
Rainfall. 35 ins. as plants, 39 ins. as 1st ratoons.
Layout. Two 4 x 4 Latin Squares and 4 randomised blocks.
Plot Area. 1/36.5 Acres.

Manurial Treatment per acre as plant cane.	Yield of Cane. Tons per acre			Gain (to date)
	Plants	1st Ratoon	Total	
Nil	26.56	26.16	52.72	
12 tons pen manure 5/7/34	32.65	29.90	62.55	9.83
24 tons pen manure 5/7/34	34.62	32.71	67.33	14.61
2 cwt. S/A. 12/7/34 2 cwt. S/A. 31/8/34	26.90	26.10	53.00	0.28

Twelve tons pen manure per acre has produced a gain of 6.09 tons in the plant cane crop and 3.74 tons in the first ratoons.

Twenty-four tons pen manure has produced a gain of 8.06 tons in the plant cane crop and 6.55 tons in the first ratoons.

The gains are statistically significant. There has been no gain from Sulphate of Ammonia on this calcareous soil.

Estate. Ottos. Field. No. 23S.
Soil Type. Gritty tuff clay (Ottos clay). 0.4% $CaCo_3$
Variety. B.H.10.12. Plant cane.
Method of cultivation. Ploughed and banked with the gyrotiller Sept. 1934.

Date of planting. 3/1/35. Date of reaping. 18/3/36.
Rainfall during growing period (14½ months). 54 ins.
Layout. Two 5 x 5 Latin Squares. Plot Area. 1/22.8 Acres.

Manurial Treatment per acre	Yield of cane Tons per acre	Gain Tons per acre
Nil	23.55	
8 tons pen manure 7/6/35 ..	23.85	+0.30
16 tons pen manure 7/6/35 ..	25.42	+1.87
3 cwt. S.A. 14/6/35 ..	23.36	—0.19
3 cwt. S.A., 2 cwt. Super, 2 cwt. K_2SO_4 15/6/35 ...	24.14	+0.59

The gain due to pen manure is significant but the smaller gain due to the complete inorganic manure is not significant.

It should be noted that in this experiment the manures were applied late —six months after planting.

B. Sulphate of Ammonia on Pen manured Plant Canes.

Estate. Greencastle. Experiment Station.
Soil Type. Alluvial (Bendals clay).
Variety. B.H.10.12.
Method of cultivation. Flat forked June 1934. Banked with the fork Sept. 1934 a basal dressing of 10 tons pen manure per acre being buried under the banks.
Planted. 1/11/34. Reaped. 25/3/36.
Rainfall during growing period (16¾ months). 75 ins.
Layout. Two 5 x 5 Latin Squares. Plot Area. 1/24.3 Acres.

Sulphate of Ammonia per acre		Yield of cane Tons per acre	Gain in yield Tons per acre
Dec. 1934	August 1935		
Nil	Nil	32.58	
Nil	2 cwt.	33.51	+0.93
Nil	3 cwt.	33.21	+0.63
2 cwt.	2 cwt.	34.06	+1.48
2 cwt.	3 cwt.	33.78	+1.20

The gain due to Sulphate of Ammonia is small and not significant.

C. Optimum Size of Dressing of Filter Press Mud and Filter Press Mud versus Pen Manure.

Estate: Thibous. Field. Blizzards No. 9.
Soil Type. Calcareous marl (Fitches clay. 45% $CaCO_3$).
Variety. Ba.11569. Plant cane.
Method of Cultivation. Cattle plough. Two cuts Sept. 1934 to remove the stools followed by four cuts. Banks finished with the hoe.

Planted. 30/11/34. Reaped. 13/3/36.
Rainfall during growing period (15½ months). 47 ins.
Layout. Two 5 x 5 Latin Squares. Plot Area. 1/28 Acre.

Manurial Treatment per acre	Yield of cane Tons per acre	Gain in yield Tons per acre
Nil	30.93	
3 tons filter press mud 30/4/35	31.75	+0.82
6 tons „ „ „ „	30.33	—0.60
9 tons „ „ „ „	31.74	+0.81
10 tons pen manure 17/4/35 ..	31.22	+0.29

In no case has the application of these organic manures significantly affected the yield. They were applied late—4½—5 months after planting.

Estate. Yeamans. Field No. 4.
Soil Type. Calcareous marl, (Fitches clay) 18% $CaCO_3$, deep phase.
Ba.11569. Plant cane and 1st Ratoons.
Planted. 2/3/34. Reaped 5/4/35 as plants; 8/4/36 as 1st Ratoons.
Layout. Two 5 x 5 Latin Squares. Plot Area 1/29 Acre.

Manurial Treatment per acre as Plant Cane	Yield of cane. Tons per acre			Gain (to date)
	Plants	1st Ratoon	Total	
Nil	31.76	22.51	54.27	
3 tons filter press mud 10/7/34	35.73	24.41	60.14	+ 5.87
6 tons „ „ „ „	36.33	26.54	62.87	+ 8.60
9 tons „ „ „ „	37.12	28.07	65.19	+10.92
10 tons pen manure 10/7/34 ..	35.57	26.16	61.73	+ 7.46

As first ratoons differences in yield exceeding 2.07 tons per acre and 2.79 tons per acre might be due to chance less than once in 20 times and less than once in 100 times respectively.

The corresponding figures for total yield are 3.13 and 4.23 tons per acre.

D. Sulphate of Ammonia on Plant Canes which have received no pen manure.

Estate. Cochranes and Thomases. Field Thomases No. 6.
Soil Type. Calcareous clay tuff. (Gunthorpes clay) $CaCO_3$ 11%.
Variety. B.H.10.12.
Method of Cultivation. Cattle plough July 1934. Trash ranged. Two cut to smother stools. Bars removed with the fork.
Planted. 1/11/34. Reaped 1/5/36.
Rainfall during growing period (18 months) 67 ins.
Layout. One 6 x 6 Latin Square. Plot Area 1/24.2 Acres.

Manurial Treatment per acre & Cultural Treatment		Yield of cane Tons per acre	Gain in yield due to Nitrogen
Banks broken.	No S/A	21.0	
„ „	2 cwt. S/A. 15/8/35 ..	23.1	+2.1
„ „	2 cwt. S/A. 21/12/34 ..		
	2 cwt. S/A. 15/8/35 ..	22.2	+1.2
Banks unbroken	No S/A	20.5	
„ „	2 cwt. S/A. 15/8/35 ..	21.1	+0.6
„ „	2 cwt. S/A. 21/12/34 ..		
	2 cwt. S/A. 15/8/35 ..	22.0	+1.5

Mean yields for 12 plots without S/A. 20.75 tons per acre.
„ „ „ 12 „ with 2 cwt. S/A. 22.10 tons per acre.
„ „ „ 12 „ „ 4 cwt. S/A. 22.10 „ „ „

No statistically significant gains from nitrogen alone have occurred on this calcareous soil.

Estate. Willis Freemans. Field No. 5.
Soil Type. Clay tuff. (Gunthorpes clay)
Variety. B.H.10.12.
Method of cultivation. Gyrotilled flat April 1934. 2 cut with cattle plough July 1934 and bars removed with fork.
Planted. 31/10/34. Reaped 4/3/36.
Rainfall during growing period (16 months) 55 ins.
Layout. One 6 x 6 Latin Square. Plot Area 1/23.3 Acres.

Manurial Treatment per acre & Cultural Treatment		Yield of cane Tons per acre	Gain in yield due to Nitrogen
Banks broken.	No S/A	34.5	
„ „	2 cwt. S/A. 7/8/35 ..	36.5	+2.0
„ „	2 cwt. S/A. 21/12/34 ..		
	2 cwt. S/A. 7/8/35 ..	35.7	+1.2
Banks unbroken	No S/A	36.6	
„ „	2 cwt. S/A. 7/8/35 ..	35.1	—1.5
„ „	2 cwt. S/A. 21/12/34 ..		
	2 cwt. S/A. 7/8/35 ..	36.3	—0.3

Mean yield for 12 plots without S/A. 35.5 tons per acre.
„ „ „ 12 „ with 2 cwt. S/A. 35.80 tons per acre.
„ „ „ 12 „ „ 4 cwt. S/A. 36.00 „ „ „

No statistically significant gains from nitrogen alone have occurred in this experiment.

E. Sulphate of Ammonia with and without trash and mulch on Plant Canes receiving no pen manure.

Estate. Collins. Field Elliotts No. 11.
Soil Type. Calcareous marl. (Fitches clay)
Variety. B.147 (B.4507).
Method of cultivation. Cattle plough; 1 cut through stools and then 2 cuts July 1934. Bars removed with fork August 1934.
Planted. 18/10/34. Reaped 22/4/36.
Rainfall during growing period (18¼ months) 61 ins.
Layout. One 6 x 6 Latin Square. Plot Area 1/23.5 Acres.

Treatment and S/A. per acre		Yield Cane Tons per Acre	Gain in yield due to Nitrogen	Gain in yield due to Mulch
Mulched 11.1.35	No S/A	34.71		+4.71
„ „	2 cwt. S/A. 22/2/35 ..			
	2 cwt. S/A. 26/7/35 ..	35.15	+0.44	+5.62
„ „	2 cwt. S/A. 26/7/35 ..	33.77	—0.94	+2.87
No Mulch.	No S/A	30.00		
„	2 cwt. S/A. 22/2/35 ..			
	2 cwt. S/A. 26/7/35 ..	29.53	—0.47	
„	2 cwt. S/A. 26/7/35 ..	30.99	+0.90	

The average yield of the 18 mulched plots is 34.54 tons per acre and of the 18 unmulched plots 30.14 tons per acre. The gain in yield of 4.40 tons is significant, and might be due to chance far less than once in 100 times. No gain was derived from Sulphate of Ammonia in this experiment on a calcareous soil.

Estate. Coconut Hall. Field No. 11.
Soil Type. Calcareous marl. (Fitches clay)
Variety. B.147 (B.4507).
Method of cultivation. Cattle plough. 2 cuts August 1934 to remove stools; then 4 cuts. Field cross holed.
Planted. 10/11/34. Reaped 30/4/36.
Rainfall during growing period (17¾ months) 53 ins.
Layout. One 6 x 6 Latin Square. Plot area 1/21.7 acres.

Treatment and S/A. per acre		Yield of Cane Tons per Acre	Gain in yield due to Nitrogen	Gain in yield due to Mulch
Mulched 12.1.35	No S/A	21.66		7.24
„ „	2 cwt. S/A. 17/1/35 .. 2 cwt. S/A. 13/8/35 ..	23.62	+1.96	7.25
„ „	2 cwt. S/A. 13/8/35 ..	21.08	—0.58	5.58
No Mulch.	No S/A	14.42		
„	2 cwt. S/A. 17/1/35 .. 2 cwt. S/A. 13/8/35 .	16.37	+1.95	
„	2 cwt. S/A. 13/8/35 ..	15.50	+1.08	

The average yield of the 18 mulched plots is 22.12 tons per acre and of the 18 unmulched plots 15.43 tons per acre. The gain in yield due to mulching of 6.69 tons is significant, and might be due to chance less than once in 100 times.

There was a small but significant gain in yield from early dressings of Sulphate of Ammonia on this calcareous soil.

The actual cost of collecting, storing and applying the trash mulch in this experiment amounted to £1. 18. 6. per acre. The increased yield of canes at 14/- per ton is worth £4. 13. 6.—a gain of £2. 5. 0. per acre from which must be deducted the extra cost of reaping and transport.

F. Sulphate of Ammonia and a complete inorganic fertilizer on plant cane which has received no pen manure.

Estate. Carlisle. Field No. 15.
Soil Type. Calcareous clay tuff. (Gunthorpes clay) 26% $CaCO_3$.
Variety. B.H.10.12.
Method of cultivation. July 1934 2 cuts with cattle plough to remove stools. Trash ranged in the cut and covered by two more cuts. Bars removed with the plough (2 cuts) and banks dressed up with the hoe.
Planted. 23/10/34. Reaped 25/2/36.
Rainfall during growing period (16 months) 62 ins.
Layout. Two 5 x 5 Latin Squares. Plot Area 1/24.8 acres.

Manurial Treatment per Acre		Yield Tons per Acre	Gain in Yield
Early. 8/12/34	Late. 26/6/35		
Nil	Nil	16.45	
Nil	2 cwt. S/A.	16.91	+0.46
Nil	2 cwt S/A., 2 cwt. Super 2 cwt. K_2SO_4 ...	15.98	—0.47
2 cwt. S/A. ..	2 cwt. S/A.	16.49	+0.04
2 cwt. S/A. ..	2 cwt S/A., 2 cwt. Super, 2 cwt. K_2SO_4 ...	16.75	+0.30

In no case has the effect of treatment been significant. In this experiment although the initial germination was very good subsequent damage from white grubs (L. antiguae) rendered frequent supplying necessary. Phosphate and potash were applied late in this experiment, viz., 8 months after planting.

Estate. Parrys. Field No. 1.
Soil Type. Deep carlcareous marl (Fitches clay). 16% $CaCO_3$.
Variety. B.H.10.12.
Method of cultivation. Ploughed and banked with the gyrotiller August 1934.
Planted. 25/10/34. Reaped 28/2/36.
Rainfall during growing period (16 months) 62 ins.
Layout. Two 5 x 5 Latin Squares. Plot area 1/24.2 Acres.

Manurial Treatment per Acre		Yield Tons per Acre	Gain in Yield
Early. 7/12/34	Late. 9/7/35		
Nil	Nil	30.88	
Nil	2 cwt. S/A.	31.88	1.00
Nil	2 cwt S/A., 2 cwt. Super, 2 cwt. K_2SO_4 ...	32.11	1.23
2 cwt. S/A. ..	2 cwt. S/A.	31.28	0.40
2 cwt. S/A. ..	2 cwt S/A., 2 cwt. Super, 2 cwt. K_2SO_4 ...	32.35	1.37

The effect of manurial treatment is very small and in no case is it significant. Phosphate and Potash were applied late in this experiment, viz., 8½ months after planting.

G. Sulphate of Ammonia on Ratoon canes on a highly calcareous soil.

Estate. Collins. Field. Elliotts No. 4
Soil Type. Calcareous marl (Fitches clay). Ca CO_3 19%.
Variety. B.H.10.12.
Reaped. 25/5/35 as plants; 11/5/36 as 1st Ratoons.
Rainfall as 1st Ratoons. 11¾ months. 39 ins.
Layout. Four 3 x 3 Latin Squares. Plot Area 1/32.3 Acres.
Manurial treatment as plant canes. 20 tons pen manure (village) per acre.

Manurial Treatment per Acre	Yield cane Tons per Acre	Gain in yield Tons per Acre
Nil	22.38	
2.2 cwt. S/A.	24.37	+1.99
4.4 cwt. S/A.	24.59	+2.21

Gains in yield exceeding 0.94 tons per acre might be due to chance less than once in 100 times.

There has been a small but statistically significant gain from Sulphate of Ammonia on this calcareous soil.

H. Residual Effect of Nitrogenous Fertilizers applied to previous crop.

(i) Residual Effect of Sulphate of Ammonia applied to plant cane on a field receiving no pen manure.

Estate. Betty's Hope. Field No. 8.
Soil Type. Lagoon clay (Elliots sandy clay). Top soil. 1.6% $CaCO_3$.
Variety. B.H.10.12.
Reaped 16/3/35 as plants; 26/4/36 as 1st Ratoons.
Rainfall. 42 ins. as plants; 47 ins. as 1st Ratoons.
Layout. 7 Randomised Blocks. Plot Area 1/25 Acre.

S/A. per acre applied to the Plant Cane		Yield of Canes Tons per acre			Gain	
March 1934	Aug.–Sep. 1934	1st Ratoons	P. Canes	Total	1st Ratoons	Total
Nil ..	Nil ..	18.35	29.40	47.75		
Nil ..	2 cwt. ..	21.35	32.42	53.77	+3.00	+6.02
Nil ..	4 cwt. ..	22.08	32.31	54.39	+3.73	+6.64
2 cwt. ..	2 cwt. ..	19.85	28.78	48.63	+1.50	+0.88
2 cwt. ..	4 cwt. ..	21.28	29.90	51.18	+2.93	+3.43

The residual effect on the first ratoon canes of the dressing of Sulphate of Ammonia applied late to the plant canes might be due to chance less than once in 100 times.

The total gains due to late Sulphate of Ammonia on this lightly calcareous soil are considerable, viz., over 6 tons per acre.

Estate. Cochranes. Field No. 2.
Soil Type. Calcareous clay tuff (Gunthorpes clay). Topsoil. 8.3% $CaCO_3$
Variety. Ba.11569.
Reaped 23/4/35 as plants; 5/5/36 as 1st Ratoons.
Rainfall. 39 ins. as plant cane; 39 ins. as 1st Ratoons.
Layout. One 6 x 6 Latin Square. Plot Area 1/22.7 Acres.

S/A. applied as Plant Cane per acre	Yield of Cane Tons per acre			Gain	
	1st Ratoons	Plant Cane	Total	1st Ratoons	Total
Nil	25.75	36.75	62.50		
2 cwt.	26.00	38.35	64.35	+0.25	+1.85
4 cwt.	26.60	27.35	63.95	+0.85	+ 1.45

The gains due to Sulphate of Ammonia alone applied to the plant cane crop are small and not statistically significant on this calcareous soil.

(ii) Residual Effect of Sulphate of Ammonia and of Nitrate of Soda applied to plant cane on a highly calcareous soil receiving no pen manure.

Estate. Parham Lodge.
Soil Type. Calcareous marl (Fitches clay). Topsoil. 24% $CaCO_3$.
Variety. Ba.11569.
Reaped 27/3/35 as plants; 12/4/36 as 1st Ratoons.
Rainfall. 49 ins. as plants; 37 ins. as 1st Ratoons.
Layout. Two 5 x 5 Latin Squares. Plot Area 1/23.8 Acres.

Nitrogen per acre applied to P. Cane in 1934	Yield of Cane Tons per acre			Loss in yield	
	1st Ratoons	Plant Cane	Total	1st Ratoons	Total
Nil	16.73	27.83	44.56		
42lb. N. as S/A. ..	15.42	26.80	42.22	1.31	2.34
42lb. N. as $NaNO_3$	14.81	25.85	40.66	1.92	3.90
84lb. N. as S/A. .	15.40	26.74	42.14	1.33	2.40
84lb. N. as $NaNO_3$	15.20	26.89	42.09	1.53	2.47

There has been a significant total loss in yield in this experiment as a result of the application of Nitrogen alone to the plant cane crop on this highly calcareous soil. This loss is a characteristic occurrence on such soils in other parts of the world.

(iii) Residual Effect of Sulphate of Ammonia and of Nitrate of Soda applied to first ratoons, the plant cane having received pen manure (25 tons per acre).

Estate. La Roches. Field No. 3.
Soil Type. Feebly calcareous clay tuff (Ottos clay). Topsoil 1.1% $CaCO_3$.
Variety. Ba. 11569.
Reaped. 21/5/35 as 1st Ratoons; 4/4/36 as 2nd Ratoons.
Rainfall. 39 ins. as 1st Ratoons; 33 ins. as 2nd Ratoons.
Layout. Four 4 x 4 Latin Squares. Plot Area 1/29 Acre.

Manurial Treatment per Acre as 1st Ratoons	Yield of Cane Tons per acre			Gain	
	2nd Ratoons	1st Ratoons	Total	2nd Ratoons	To date
Nil	11.97	21.03	33.00		
60lb. N. as S/A. ..	13.24	28.00	41.24	+1.27	+8.24
60lb. N. as $NaNO_3$	12.65	27.28	39.93	+0.68	+6.93

The residual effect on the second ratoon canes of the nitrogen applied to the first ratoons might be due to chance less than once in 20 times. The difference in yield on the plots with Sulphate of Ammonia and Nitrate of Soda cannot be established as statistically significant.

In this experiment there has been a large total gain from Nitrogen alone on a lightly calcareous soil.

IV. CULTURAL EXPERIMENTS.

(*A*) *Breaking of Banks.*

The yields from the individual treatments for the two experiments,* Thomas's No. 6 and Willis Freeman's No. 5 have already been shown on pp. 24 and 25.

The following table shows the mean yields for the 18 "bank broken" plots and the 18 "unbroken" plots in these two experiments.

Experiment	Banks Broken	Banks Not Broken
Thomas's No. 6	22.10	21.20
Willis Freeman's No. 5 ..	35.57	36.00

The differences are not significant.

(*B*). *Cross Holes v. Open Furrows.*

Estate. Gaynors. Field. No. 4.
Soil Type. Calcareous marl (Fitches clay).
Variety. B.147 (B.4507)
Method of cultivation. Two cut with cattle plough Aug. 1934 to smother stools. Bars removed with the fork. Cross holed portion Oct. 1934.
Planted. 15/11/34. Reaped. 13/5/36.
Rainfall during growing period (18 months) 54 ins.
Layout. 8 Randomised Blocks with two replicates of each treatment per block. Plot Area. 1/25 Acre.

P. E. Turner has found (Trop. Agric. XII pp. 321–322) that a serious fall off in yield can occur on soils containing free $CaCO_3$ as a result of applying Sulphate of Ammonia in dressings exceeding a limiting value.

* In both these experiments the canes were planted in typical Antiguan furrows, viz: between banks 18" high. On the breaking of such banks the canes become unduly smothered. C.F. Charter has obtained significant and economic gains in an experiment in which shallow banks were broken gradually early in the life of the plants.

Cultural Method	Yield of Cane. Tons per Acre
Open furrows	26.27
Cross holed furrows	26.09
Difference	0.18

There is no significant difference between treatments.

Estate. Blakes. Field No. 20 W.
Soil Type. Calcareous clay tuff (Gunthorpes clay).
Variety. B.H.10.12.
Method of cultivation. Two cut with cattle plough to cover stools early Sept. 1934. Bars removed with fork end of Sept. Subsoiled Oct. 13th and cross holed portion cross holed immediately after.
Planted. 14/12/34. Reaped. 9/3/36.
Rainfall during growing period (16 months) 61 ins.
Layout. 8 Randomised Blocks with two replicates of each treatment per block. Plot Area. 1/33 Acre.

Cultural Method	Yield of Cane. Tons per Acre
Open furrows	25.42
Cross holed furrows	24.70
Difference	0.72

In both of the above experiments the data indicate that cross holing has had an adverse effect on yield. The differences however, viz. 0.18 tons per acre and 0.72 tons per acre cannot be established as statistically significant.

The Gaynors experiment was one in which the alleged advantages of cross holing might well have been expected to show themselves as the soil is a very light one for Antigua in which water conservation would no doubt be an important factor during the early dry months of 1935 (Rainfall January—April 3.24 ins.)

At Blakes on the other hand soil conditions were not those which might be expected to favour cross holing although the field selected had in the past been cultivated in this way. Rainfall during the period January—April 1935 amounted to 7.57 ins.

C. Distance of Planting.

Estate. Blackmans. Field No. 11.
Soil Type. Calcareous marl (Fitches clay).
Variety. B.147 (B.4507) Plant Cane.
Method of cultivation. Cattle plough August 1934, 2 cut. Bars removed with the fork.
Manuring. 25 tons pen manure buried under the banks.
Rainfall during growing period (17 months) 59 ins.
Layout. Four 3 x 3 Latin Squares. Plot Area 1/31 Acre.

Distance of Planting (within rows)	Yield of Cane Tons per acre	Difference
2′	26.73	
3′	24.17	—2.56
4′	24.89	— 1.84

Differences in yield greater than 1.54 and 2.14 tons cane per acre might be due to chance less than once in 20 times and once in 100 times respectively.

Estate. Thibous. Field. Big Piece.
Soil Type. Calcareous marl. (Fitches clay).
Variety. Ba.11569.
Cultivation. Cattle plough.
Manuring. Pen manure buried under banks.
Planted. 1/12/33. Reaped. 26/2/35 as plants; 11/3/36 as 1st Ratoons.
Rainfall. 36 ins. as plants; 41 ins. as 1st Ratoons.
Layout. Four 3 x 3 Latin Squares. Plot Area 1/30 Acre.

Distance of Planting (Within rows)	Yield of Cane. Tons per Acre			Difference
	Plants	1st Ratoons	Total	
2′	17.28	28.03	45.31	
3′	17.58	28.12	45.70	+0.41
4′	16.47	27.03	43.50	—1.81

Neither as Plant canes nor as Ratoons are the differences between treatments significant.

The greatly increased yields obtained as 1st Ratoons as compared with the plant cane yields are due to a larger and very much better distributed rainfall.

D. Time of Planting.

Estate. Jolly Hill. Field. Wood Side Piece.

Soil Type. Alluvial. (Yorks clay).

Variety. B.H.10.12. Plant Canes.

Method of cultivation. 2 cut with cattle plough July 1934 to remove stools, then 2 cuts and bars removed with fork August 1934.

Manurial Treatment. S/A. 3 cwt. per acre to all plots.

Layout. 2 5 x 5 Latin Squares. Plot Area. 1/29.6 Acres.

Time of Planting	Yield of Cane (tons per acre)
Mid Sept. (1934)	25.92
„ Oct.	28.02
„ Nov.	27.81
„ Dec.	23.22
„ Feb. (1935)	23.79

Differences in yield exceeding 1.50 tons and 2.02 tons per acre might be due to chance less than once in 20 times and once in 100 times respectively.

Cut up cane was used as the planting material during 1934; in February 1935 cabbage plants were used. Germination was excellent in the case of the September planting (86% original); fairly good in the case of October planting (65% original); and November planting (60.8% original); very poor in the case of December planting (11.2% original) and fairly good again in the case of February planting (68.6% original).

The following table shows the rainfall during the growing period:—

1934	Sept. ..	2.73	1935	Jan. ..	1.29	1936	Jan. ..	1.45
	Oct. ..	1.79		Feb. ..	1.49		Feb. ..	1.33
	Nov. ..	10.58		Mch. ..	0.94		Mch. ..	1.36
	Dec. ..	5.21		Apr. ..	1.38			4.14
		20.31		May ..	1.13			
				June ..	3.68			
				July ..	4.79			
				Aug. ..	2.72			
				Sep. ..	4.60			
				Oct. ..	7.02			
				Nov. ..	2.91			
				Dec. ..	1.52			
					33.47			

The poor germination in December was due to the water logged condition of the soil at the time of planting: the December plots were finally established in June at the same time as the February plots.

Discussion of Results and Summary. Manurial and Cultural Experiments.

Significant and considerable gains in yield have followed the application of pen manure to plant canes at Pares and Cochranes. At Gaynors the pen manure applied to the plant cane crop has exerted significant residual effects on the first ratoons.

About 12—15 tons pen manure per acre appears to be the optimum application for producing economic gains, the rate of increase in yield with heavier applications falling off rapidly.

* At Ottos the increased yield due to pen manure although significant is very small. The manure used in this experiment was very dry and of rather poor quality: it was applied late—six months after planting.

Late applications of filter press mud and of pen manure at Thibous failed to give increased yields. The residual effect of applications made to the plant cane crop at Yeamans have been significant, especially in the case of pen manure and of the heavier applications of filter press mud.

On the alluvial soil at Greencastle the increased yields following the application of Sulphate of Ammonia alone to plant canes which received a basal dressing of 10 tons pen manure per acre were small and were not significant.

In the 1934–36 experiments conducted by this Department no significant increases in yield have resulted from the application of Sulphate of Ammonia alone to Plant cane on soils receiving no pen manure except in the case of one experiment where the application was made in the presence of a partly decayed trash mulch.

** No significant gains in yield have followed late applications of complete inorganic fertilizer. The lack of response may have been due to the lateness of the applications. Support is given to this view by the very small response to late applications of pen manure at Ottos and the lack of response to late applications of pen manure and of filter press mud at Thibous and also by the response to early applications of complete inorganics in the small scale experiment at Greencastle already reported.

*It is important to note that applications of pen manure even when made early are not invariably followed by economic gains in yield. In one experiment C. F. Charter has found that 20 tons good pen manure gave only 1.35 tons per acre gain.

At Gaynors the pen manure was applied nearly six months after planting but germination and early growth were slower than at Ottos.

** Significant gains from a complete inorganic fertilizer applied early have been obtained at Vernons and at Delaps—Experiments conducted by C. F. Charter.

Small but significant gains in yield resulted from the application of Sulphate of Ammonia to ratoon canes on a highly calcareous soil at Collins. This result is similar to those obtained on calcareous marls at Fitches Creek and the Diamond in 1935.

Small but significant residual effects from Sulphate of Ammonia alone applied to the preceding crop were obtained at Betty's Hope and La Roches. The total gains from Nitrogen alone were large. At the latter station Nitrate of Soda also showed a slight residual effect. There was no residual gain from Sulphate of Ammonia at Gaynors and at Parham Lodge the results of the two crops—plant cane 1935 and 1st ratoon 1936 indicate a small but significant loss resulting from applications of nitrogenous fertilizers. This is characteristic of highly calcareous soils.

The question of the response of Antigua soils to various mixtures of inorganic manures including complete inorganics is now under more thorough investigation in a series of experiments which were laid down in 1935. These experiments enable more critical direct comparisons of the value of organic and inorganic manures than those already reaped.

As was the case in 1935 no increase in yield has resulted from the breaking of Antiguan banks. In the 1936 experiments breaking was carried out in two stages and was begun within two months of planting. A marked decrease in the number of tillers was observed at Willis Freemans to follow the preliminary breaking and it is obvious that "lateness" has not been responsible for the failure of breaking to cause increases. It seems probable that the deep furrows customary in Antigua are unsuited for this cultural operation owing to the burying of the plants when the large volume of earth contained in the high banks is returned to the furrows, and that normal furrows would be more satisfactory. The gains to be derived from the operation if carried out successfully have been described in the 1935 report, page 33.

Cross holing has again proved inferior to planting in the open furrows although the difference in yields is not significant in the case of either experiment. At Gaynors conditions were such as are generally considered to be favourable to cross holing. One argument in favour of cross holing is that the cross note bar provides a convenient means of applying manure to the plant cane crop. It would appear desirable to compare pen manure applied in this way with an equal application ploughed into the furrow.

At Blackmans planting at 2′ in the row has given a small but significant gain in yield as compared with planting distances of 3′ and 4′. It is unlikely that such a gain would be economic in view of the increased cost of plants and planting at the 2′ spacing. At Thibous the ratoon yields confirm the results obtained as plant cane that no benefits result from planting at a smaller distance in the row than 4′.

October and November planting of B.H.10.12 gave significantly higher yields than September or December and February planting. The best germination was obtained in September, and the plots established during that month stood the dry months of 1935 sufficiently well to outyield the December and February plots. Earlier planting than is generally practised appears desirable.

At Jolly Hill the early plot (October) of B.147 (B.4507) outyielded the late (December) plot by 7.12 tons per acre. At Parham New Work the "late" plot germinated more readily than the "early" plot as a result of soaking in lime water and was established before the latter. It outyielded the "early" but later established plot by 2 tons per acre.*

* Neither soil type was well suited to B 147. C. F. Charter on a soil type well suited to this variety obtained increased yields from September and October plantings as compared with later plantings.

APPENDIX II.

The following table shows the quantities of artificial fertilizers imported into Antigua during 1936:—

Sulphate of ammonia	....	....	317 tons
Superphosphate	....	....	122 „
Muriate of Potash	....	....	10½ tons
Nicofos	....	....	25 „
Total	....	....	474½ tons

APPENDIX 3.

LAND SETTLEMENT.

Greencastle. At the end of December 100 plots of a total of 101 available were occupied, 98 of these being arable plots and the remaining two a shop site and a pasture lot respectively.

There were no evictions during the year but there was one allottee, who voluntarily relinquished his plot and two transfers as a result of the death of the holders.

The general standard of cultivation is improving but the faults noted in earlier reports are still rather common, viz., inadequate drainage and failure to keep growing crops weeded. The tendency towards late cultivation and crop planting has been recorded in earlier reports and unfortunately is more marked than usual with respect to the 1936—38 crop. This has been due to the prolonged rains during the latter half of the year, which have seriously delayed cultivation throughout the district on estates as well as on peasants holdings.

Allottees generally are beginning to realise the value of manure and especially of sulphate of ammonia for their ratoon canes and are making increased use of the facilities for obtaining advances for fertilizers which have been made available for them.

The Greencastle allottees supplied 2,831 tons of cane to Bendals Factory. This was purchased at 14s. per ton (including Bonus) the gross value amounting to £1,976. 2. 8½. After deduction of weighing charges and sums due to the Government as loans or instalments of the purchase price of lots, the balance of £1,622. 2. 8. was paid to the allottees through the Agricultural Department.

The 1937 crop will be reaped from 205 acres, including 80.5 acres plant cane, and is estimated at 3,000 tons.

During 1936 £19. 10. 1. was spent on drains and roads, and £86. 8. 10 and £65.7. 0, advanced for cultivaiton and reaping and for fertilizers respectively.

Matthews: At the end of December 122 lots out of a total of 137 available were occupied. There were no evictions during the year but two lots were transferred to other owners.

The 1936 crop amounted to 1,173 tons which was sold to the Antigua Sugar Factory at 13/6 per ton (including carting allowance) the gross value being £783. 16. 2½.

After deduction of packing, weighing and supervision charges, and of the sums due to the Government for loans, instalments of the purchase price, etc., the balance £611. 14. 9. was paid to the allottees.

The 1937 crop will be reaped from 136 acres (including 50 acres plant cane) and is estimated at 1,100—1,200 tons.

During the year £19. 12. 7 was spent on drains and estate roads and £72. 19. 10. and £9. 7. 6. advanced for cultivation and reaping and for fertilizers respectively.

Jonas's. At the end of December 64 lots out of a total of 64 available were occupied.

The 1936 crop amounted to 1,123 tons. This was sold to the Antigua Sugar Factory at 13/11½ per ton, the gross value being £783. 18. 5½.

After making the usual deductions the sum of £615. 0. 4. was paid to the allottees.

The 1937 crop will be reaped from 99 acres (including 34 acres plant cane), and is estimated at 1,200—1,300 tons.

During the year £6. 19. 0. was spent on providing cane plants for new allottees and £9. 3. 2 on drains and estate roads, while £25. 5. 10 and £16. 7. 6. were advanced for cultivation and reaping and for fertilizers respectively.

The following table shows the allocation of the crop revenues from the three Land Settlements during the period under review. The total gross receipts amounted to £3,543. 17. 4½, the total reaping, packing and weighing charges to £78. 17. 3. and the unpaid balances to 9/3½ so that the allottees received £3,464. 10. 10. either in cash, fertilizer or in instalments of the purchase price of their plots.

TABLE

SUMMARY SHOWING ALLOCATION OF CROP REVENUES FROM THE LAND SETTLEMENT SCHEMES, 1936.

Settlement	Total Value Received.	Rents Deducted	Agricultural Loans received	Supervision, Reaping, Weighing & Packing Charges *	Net Proceeds paid	Balance unpaid
Greencastle ..	1976: 2: 8½	235: 15: 8	114: 14: 1	6: 8: 0½	1622: 2: 8	0: 2
Matthews ..	783: 16: 2½	91: 2: 10	46: 17: 5	33: 14: 11½	611: 14: 9	6: 3
Jonas's ..	783: 18: 5½	84: 4: 11	45: 18: 2	**38: 14: 3	615: 0: 4	0: 9½
	3543: 17 4½	408: 3: 5	207: 9: 8	78: 17: 3	2848: 17: 9	9: 3½

*Bendals .... Weighing ½d. per ton
Matthews and Jonas's .... 1d. per ton
,,

**Including £5. 19. 0. spent on reaping the crop on an abandoned allotment. Packing 4d. per ton, Supervision 2d. per ton.

In January 1937 a Bonus of £27. 8. 1 was received with respect to the 1936 Jonas's crop of which the allottees received £27. 7. 9 viz. 5.86d. per ton of cane.

The growth of the Land Settlement Scheme since 1932 is set out in the following table which shows the tonnage of cane marketed each year through the Agricultural Department, the gross value, the marketing charges, the deductions made for loans and instalments due on the land and the cash payments made to the allottees.

Year.	1932.	1933.	1934.	1935.	1936.
Canes Greencastle (tons)	253	1,426	1,869	1,465	2,831
Canes Matthews (tons)	152	498	876	766	1,173
Canes Jonas's (tons)	....	....	162	485	1,123
Total Canes (tons)	405	1,924	2,907	2,716	5,127
Gross Value ...	£258	£1,342	£,2,044	£1,878	£3,544
Marketing Charges ..	1	9	25	39	79
Deductions	84	350	471	488	616
Cash Paid Allottees	173	983	1,548	1,351	2,849

APPENDIX IV.

METEOROLOGICAL.

RETURN OF RAINFALL OF THE FOLLOWING PLACES IN ANTIGUA FROM 1ST JANUARY TO 31ST DECEMBER, 1936.

No.	Station.	January.	February.	March	April.	May	June.	July.	August.	September.	October.	November.	December.	Total.
1	Botanic Station ...	1·96	1·36	1·58	4·46	8·76	3·31	8·61	5·78	11·86	12·57	5·51	8·55	74·31
2	Blakes	2·77	1·85	0·90	2·14	10·50	3·54	6·60	6·87	13·83	8·35	4·94	9·74	71·97
3	Five Islands ...	1·84	1·43	0·57	3·70	12·08	7·09	6·23	8·27	12·17	7·70	4·18	6·58	71·84
4	Vernons	1·27	1·61	0·96	3·42	10·54	3·14	7·56	6·09	10·66	11·32	5·29	8·93	70·79
5	Parham New Work	1·09	1·52	0·85	2·86	10·24	2·88	7·08	4·97	8·65	8·59	8·96	11·44	69 13
6	Creekside	2·52	1·79	0·78	3·48	10·51	5·40	5·78	7·16	13·58	9·39	4·87	3·87	69·13
7	Bendals Factory ...	2·24	1·48	1·25	2·20	11·17	4·86	6·11	6·07	13·56	7·32	4·20	8·29	68·75
8	Delaps	3·17	1·31	0·77	2·00	10·07	3·69	6·09	7·67	11.83	7·87	4·60	8·00	67·07
9	Belvedere	2·09	1·60	1·17	2·05	9·76	6·65	6·58	5·60	11·76	8·01	3·85	7·72	66·84
10	Antigua Sugar Factory	1·75	1·44	0·93	4·57	7·49	1·90	7·30	4·81	11·49	11·69	4·92	8·20	66·49
11	Sandersons ...	1·92	1·77	0·55	3·25	10·24	3·61	6·48	5·55	10·04	9·64	4·96	7·74	65·75
12	New Division ...	2·21	1·10	1·02	1·76	11.96	6·11	6·08	6·28	10·21	9·00	4·65	5·35	65·73
13	Carlisle	1·91	1·59	1·18	5·04	6·97	3·12	7·09	5·04	10·38	9·21	7·20	6·92	65·65
14	Pattersons ...	3·22	1·29	0·53	1·98	7·86	6·21	5·50	6·33	11·74	5·81	4·99	9·49	64·95
15	Bennett Bryson's Office	1·60	1·61	1·27	4.48	7·10	3·97	7·22	4·61	10·92	9·25	4·83	7·42	64·28
16	Yorkes	1·45	1·30	1·36	2·30	10·42	5·63	6·17	5·37	11·50	8·59	3·35	6·78	64·22
17	Parham Lodge ...	1·07	1·35	1·14	3·41	10·50	3·17	7·87	5·36	8·09	9·26	4·44	8·51	64·17
18	Yeptons	0·79	0·98	0·87	3·47	9·31	6·83	7·41	5·01	12·56	7·67	3·90	5·17	63·97
19	Parham Hill ...	1·48	1·50	0·74	3·00	10·93	2·97	7·58	5·49	8·59	9·26	4·44	7·75	63·73
20	Ottos	2·34	1·30	0·73	2·00	4·79	4.20	6·89	4·65	11.22	12·98	4·40	7·47	62·97
21	Belmont	1·88	1·45	1·32	3·72	8·50	4·13	5·54	4·81	9·02	9·55	4·61	7·56	62·09
22	Orange Valley ...	1·70	1·58	0·40	1·73	9·53	6·27	5·44	6·43	11·55	7·73	4·51	5·19	62·06
23	The Diamond ...	1·48	1·65	0·55	3·07	9·20	3·85	6·83	5·65	10·26	8·03	3·67	7·61	61·85
24	Morris Looby's ...	2·76	1·27	0·77	1·66	8·16	4·47	5.57	6·05	11·24	7·71	3·52	8·29	61·47
25	Point Wharf ...	0·93	1·61	1·25	3·43	6.76	4·40	7·12	4·18	11·36	8·50	4·75	6·86	61·15
26	Gilberts Creek ...	1·27	1·25	1·72	2·98	10·31	3·09	6·15	5·32	8·06	7·29	4·19	8·92	60·55
27	Mercers Creek ...	1·21	0·92	2·11	2·86	11·08	2·90	6·02	5·86	7·64	6·73	3·56	9·53	60·42
28	Gaynors	1·38	0·90	1·40	2·06	9·64	2·72	6·16	6·32	11·53	4·94	4·74	8·24	60·03
29	Pares & Cochranes	1·30	1·36	0·66	2·95	9·37	2·95	6·67	4·56	8·93	7·94	4·51	8·69	59·89
30	Long Lane ...	1·26	0·96	1·43	2·37	9·15	3·70	3·95	6·20	11·31	6·57	3·30	9·36	59·56
31	Paynters	1·89	1·13	0·80	4·59	7·72	2·12	5·79	5·75	8·03	10·44	4·89	6·36	59·51
32	Lyons	1·93	1·47	0·70	2·32	7·94	3·22	5·68	6·64	11·34	5·88	3·82	8·44	59·38
33	The Cotton ...	1·07	1·20	1·39	2·56	11·52	2·70	6·42	5·26	7·25	7·94	4·06	7·78	59·15

RETURN OF RAINFALL ON THE FOLLOWING PLACES IN ANTIGUA FROM 1ST JANUARY TO 31ST DECEMBER, 1936.

No.	Station	January	February	March	April	May	June	July.	August	September	October	November	December	Total.
34	Millars	1·84	1·59	1·68	3·92	5·86	5·02	5·62	4·80	9·62	7·81	6·18	4·84	58·78
35	Collins	1·41	1·21	1·75	1·71	10·55	4·41	5·85	5·19	8·75	7·09	3·38	7·30	58·60
36	Comfort Hall ...	1·32	0·40	1·72	2·60	11·36	2·87	6·73	5·46	8·57	6·08	3·83	7·49	58·43
37	The Garden ...	1·13	1·13	1·10	2·69	9·02	2·99	5·51	4·87	9·50	7·96	3·74	8·58	58·22
38	Wallings Dam ...	1·71	0·86	0·19	1·41	7·27	4·52	6·32	5·51	12·45	8·10	4·32	4·93	57·62
39	Willis Freemans ...	2·13	1·06	0·76	1·30	9·28	3·25	5·06	4·85	11·54	6·93	4·00	7·27	57·43
40	Betty's Hope ...	1·48	1·43	1·38	2·45	9·78	3·36	6·39	4·69	8.47	7·14	3·91	6·91	57·39
41	Burkes	2·41	1·12	0·46	1·36	8·86	3·43	5·25	4·56	11·72	7·09	3·61	7·52	57·39
42	Fitches Creek ...	1·66	0·95	1·16	4·19	6·80	2·41	5·50	5·66	7·25	10·50	4·80	6·26	57·14
43	Wallings Hill ...	1·61	0·83	0·21	1·41	7·25	4·35	6·20	5·39	12·42	8·01	4·26	5·00	56·94
44	Weirs	1·72	1·01	1·10	3·25	6.14	3·18	3·34	7·26	7·41	10·77	4·05	7·24	56·47
45	Judges	1·11	1·40	1·34	4·42	6·09	3·19	5·32	4·95	10·27	6·51	5·61	5·77	55·98
46	Ffryes	1·72	1·22	0·98	2·00	7·11	2·71	4·04	5·42	11·61	6·55	3·19	9·33	55·88
47	Duers	1·57	1·52	0·50	2·67	9·45	3·58	4·39	4·33	9·52	7·45	3·41	7·29	55·68
48	Cochranes and Thomases ...	2·74	1·08	0·73	1·80	7·82	3·06	3·70	6·05	10·65	6·56	3·47	7·38	54·54
49	North Sound ...	1·05	1·08	0·50	2·92	7·80	2·82	5·78	4·87	6·62	8·50	4·22	7·78	53·94
50	Cedar Valley ...	0·86	1·25	0·55	2·83	6·05	1·91	5·99	4·90	10·30	9·39	5·01	4·68	53·72
51	Blackmans ...	1·21	0·86	0·44	2·99	5·86	2·06	6·29	4·96	8·14	9·76	4·34	6·61	53·52
52	Cassada Garden ...	1·22	1·32	0·71	4·40	6·12	1·65	5·74	4·11	8·72	7·52	5·01	6·84	53·36
53	Donovans	1·46	1·07	0·30	3·62	5·52	2·00	6·23	4·21	7·39	10·01	4·29	7·04	53·14
54	Marble Hill ...	2·29	1·55	0·60	2·02	6·15	3·50	5·91	3·65	9·47	7·10	4·61	5·49	52·34
55	Montpelier ...	1·87	0·00	0·00	1·96	6·70	2·58	4·37	4·52	12·73	5·75	3·80	7·71	51·99
56	Weatherills ...	1·76	1·47	0·76	2·56	4·76	3·20	3·10	5·00	1·65	9·02	2·32	4·95	50·55
57	Langfords ...	1·52	1·32	1·43	3·27	6·18	3·18	5·02	3·29	9·05	6·07	4·66	5·48	50·47
58	Winthorpes ...	0·45	0·98	1·00	2·68	6·75	2·07	4·58	3·96	8·64	5·41	3·63	7·68	47·83
59	High Point ...	0·63	1·50	0·87	3·87	6·35	2·40	4·45	5·64	7·21	5·19	3·13	6·14	47·38
60	Cedar Hill ...	0·69	0·56	0·33	2·76	5·72	2·29	5·10	3·95	7·42	7·61	5·19	4·09	45·71
	Codrington Village Barbuda	1·74	1·19	0·55	1·57	4·98	1·76	4·72	5·57	6·84	3·93	1·89	7·17	41·91

AVERAGE RAINFALL 1874—1935.

In	1874	the	average	rainfall	on	41	stations	was	ins. 31.16
	1875	"	"	"	"	40	"	"	28.78
	1876	"	"	"	"	36	"	"	41.98
	1877	"	"	"	"	38	"	"	49.05
	1878	"	"	"	"	53	"	"	47.11
	1879	"	"	"	"	52	"	"	61.54
	1880	"	"	"	"	46	"	"	49.68
	1881	"	"	"	"	44	"	"	53.75
	1882	"	"	"	"	45	"	"	33.04
	1883	"	"	"	"	56	"	"	55.51
	1884	"	"	"	"	56	"	"	43.98
	1885	"	"	"	"	53	"	"	43.39
	1886	"	"	"	"	55	"	"	47.78
	1887	"	"	"	"	50	"	"	43.68
	1888	"	"	"	"	47	"	"	44.23
	1889	"	"	"	"	50	"	"	73.59
	1890	"	"	"	"	45	"	"	33.00
	1891	"	"	"	"	45	"	"	50.01
	1892	"	"	"	"	53	"	"	38.43
	1893	"	"	"	"	54	"	"	38.69
	1894	"	"	"	"	68	"	"	38.85
	1895	"	"	"	"	69	"	"	52.91
	1896	"	"	"	"	56	"	"	59.85
	1897	"	"	"	"	54	"	"	39.67
	1898	"	"	"	"	66	"	"	48.85
	1899	"	"	"	"	63	"	"	47.50
	1900	"	"	"	"	64	"	"	36.95
	1901	"	"	"	"	65	"	"	57.61
	1902	"	"	"	"	71	"	"	58.80
	1903	"	"	"	"	68	"	"	43.68
	1904	"	"	"	"	70	"	"	37.01
	1905	"	"	"	"	68	"	"	31.40
	1906	"	"	"	"	66	"	"	53.93
	1907	"	"	"	"	70	"	"	43.45
	1908	"	"	"	"	72	"	"	43.79
	1909	"	"	"	"	70	"	"	45.15
	1910	"	"	"	"	70	"	"	34.77
	1911	"	"	"	"	72	"	"	36.47
	1912	"	"	"	"	72	"	"	32.20
	1913	"	"	"	"	73	"	"	42.76
	1914	"	"	"	"	72	"	"	36.86
	1915	"	"	"	"	75	"	"	56.14
	1916	"	"	"	"	74	"	"	58.23
	1917	"	"	"	"	70	"	"	36.62
	1918	"	"	"	"	70	"	"	37.87
	1919	"	"	"	"	70	"	"	49.56
	1920	"	"	"	"	70	"	"	30.09
	1921	"	"	"	"	74	"	"	30.32
	1922	"	"	"	"	70	"	"	35.14
	1923	"	"	"	"	68	"	"	32.41
	1924	"	"	"	"	67	"	"	41.57
	1925	"	"	"	"	68	"	"	30.75
	1926	"	"	"	"	70	"	"	50.20
	1927	"	"	"	"	67	"	"	45.84
	1928	"	"	"	"	63	"	"	33.24
	1929	"	"	"	"	66	"	"	40.78
	1930	"	"	"	"	59	"	"	25.51
	1931	"	"	"	"	63	"	"	48.62
	1932	"	"	"	"	63	"	"	58.47
	1933	"	"	"	"	59	"	"	41.50
	1934	"	"	"	"	60	"	"	41.86
	1935	"	"	"	"	57	"	"	38.31
	1936	"	"	"	"	60	"	"	59.99

AVERAGE MONTHLY RAINFALL, 1936.

	inches.
January	1.66
February	1.26
March	0.94
April	2.84
May	8.45
June	3.61
July	5.92
August	5.37
September	10.15
October	8.14
November	4.41
December	7.24
	59.99

The average rainfall for 63 years is 43.62 inches, so that the rainfall for the year 1936 is 16.37 inches above the average.

METEOROLOGICAL SUMMARY, 1936.

Kept at the Botanic Station, Antigua.

Month	Thermometer								Barometer Reading		Rainfall Botanic Station	Barometer Corrected		Thermometer	
	Dry		Wet		Relative Humidity %		Minimum	Maximum	9 A M	3 P M		Highest	Lowest	Highest Max.	Lowest Min.
	9 A M	3 P M	9 A M	3 P.M.	9 A M	3 P M									
January ...	78·3	79·2	71·6	72.3	71·5	71·0	71·3	82·7	30·087	30·002	1·96	30·152	29·957	85·0	70·0
February ...	77·4	80·5	70·7	71·1	71·0	61.4	69·7	84·0	30·082	30·016	1·36	30·143	29·949	87 0	65·0
March ...	78·7	80·4	71·6	72·5	69·8	67·5	70·1	84·1	30·052	29·979	1·58	30·121	29·907	87·0	67·0
April ...	80·6	81·7	74·4	74.8	73·9	71·7	72·9	85·3	30·041	30·013	4·46	30·151	30·001	87·0	69.0
May ...	81·0	83·2	76·5	77.3	81·3	76·2	73·1	85·6	29·980	29·922	8 76	30·051	29·852	89·0	72·0
June ...	83·0	84·1	77·5	78·3	77·5	76·3	75.8	86·6	30·037	29·994	3·31	30·125	29·935	89·0	75·0
July ...	82·3	82·8	78·1	78·6	82·6	82·7	75.8	85·9	30·062	30·021	8·61	30·112	29·942	87·0	72.0
August ...	82.7	83·5	78·2	78.6	81·1	79·9	75·3	86.7	30·006	29·951	5·78	30·036	29·886	91·0	73 0
September ...	82·5	83·3	78·0	78·8	81·5	81·7	74·3	86·6	29·993	29·929	11·86	30·069	29·847	92·0	68 0
October ...	81·6	81·8	77·8	77·5	83·5	82·3	73·4	85·1	29·998	29·919	12·57	30·080	29·865	90·0	72·0
November ...	80·4	81.1	76·8	77.6	84·7	85·3	73.7	84·4	30·010	29·928	5 51	30·105	29·816	89 0	71·0
December ...	78·6	79·0	74·1	75·1	80·5	83·3	71·5	82·8	30·018	29·932	8·55	30·101	29 742	86·0	68·0
											74·31				
Means for the Year ..	80·6	81·7	75·4	76·0	78.2	76·6	73·1	85·0	30·030	29·967					

Highest Maximum Temperature = 92° on 14th September.
Lowest Minimum „ = 65° on 28th February.
Highest Barometer (corr.) = 30.152 on 21st January.
Lowest Barometer (corr.) = 29.742 on 11th December.
Greatest Rainfall in 24 hours = 3.35 ins. on 2nd November.

PART II.

Report on the Activities of the Peasant Agricultural Branch of the Agricultural Department during 1936.

Introduction. During the latter part of the month of May, 1936, arrangements were made by the Governments of Antigua and Montserrat for the Curator, Department of Agriculture, Montserrat, to be seconded for duty in Antigua as Specialist Agricultural Officer. In obedience to orders from the Commissioner of Montserrat, Mr. C. A. Gomez arrived in Antigua on the 18th May and reported to the late Colonial Secretary, Mr. H. E. Bader, who outlined the immediate duties of the new office as follows:—

> "The object of your visit is to draw up a plan for the development of peasant agriculture, including the extension of existing crops and the establishment of such new ones as you may consider to be likely to succeed in the conditions which exist here."

To this end the newly appointed officer made a thorough survey of the economic conditions of the peasantry and submitted a scheme for the improvement of peasant agriculture on such lines as he considered would bring about the desired rehabilitation of peasant agriculture.

The investigation was conducted on the following broad lines:—

1. The present economic position of the agricultural industries of the island and their relationship to the peasants.

2. The manner in which peasants now obtain credit or advances for carrying out field operations.

3. The practicability of devising a credit system under which peasants can obtain advances.

4. The methods in which crops are marketed.

5. The advantages to be gained by the general application of the principles of co-operation, and the method of effecting such an organization.

As a result of the enquiry on the above lines, specific recommendations were made for improving peasant agriculture under the following heads:—

1. The improvement of the peasant Sugar Cane and Cotton Industries by providing best planting material, credit system, better transport facilities and marketing.

2. The fostering of a fruit and vegetable industry by the establishment of a Peasants' Information Bureau and Marketing Depot with facilities for handling an export trade in Fruit and Vegetables.

3. The establishment of further Land Settlement Schemes.

FORMATION OF PEASANTS' AGRICULTURAL OFFICE.

As a direct result of the recommendations relating to the establishment of a Fruit and Vegetable Industry the new Peasants' Agricultural Office was established in October, 1936, with the following staff:—

C. A. Gomez	..	.. Agricultural Development Officer.
R. Hall	..	.. Agricultural Instructor.
J. White	..	.. Packing Assistant.
W. Harris	..	.. Nursery Attendant.

The expenditure incurred on the special service from the date of secondment of the Curator, Montserrat, and including the salaries, etc., of the other members of the staff were as follows:—

	£	s.	d.
Transfer Expenses	16	12	6
Personal Emoluments			
Specialist Agricultural Officer	278	15	0
Agricultural Instructor	37	10	0
Packing Assistant	15	8	7
Nursery Attendant	10	16	0
Travelling Allowance			
Specialist Agricultural Officer	66	18	0
Agricultural Instructor	12	10	0
House Allowance	24	16	9
Nursery and Seed	50	0	0
Incidentals and Experimental Marketing	22	13	1
	£535	19	11

The new office therefore came into being during the last three months of the year in the form of a Peasants Information Bureau and Government Marketing Depôt. This new Department, by the end of the year, was still only in the process of organization.

In view of the fact that a real peasantry exists in the volcanic district of Antigua, this section of the island was the scene of greatest activity. Numerous meetings were held at various points, chiefly Liberta, Gracehill, Piccadilly, Sweets, and Freetown, and the whole scheme for development of peasant agriculture outlined to the inhabitants.

In all districts great appreciation was manifested by the peasants in the new development schemes and towards the end of the year some 300 peasant holdings were planted in the vegetable crops advocated by the office.

In order to propagate plants for peasants, Nurseries were set up at the following places:— The Follies, Piccadilly, Liberta, John Hughes, Matthews, and the Botanic Gardens. In all centres the Nurseries proved inadequate to cope with the demand for planting material and the great interest displayed by peasants showed that they were eager to co-operate in the serious efforts made by the Government to improve their economic condition.

The Nursery work section of the Scheme resulted in the establishment of vegetable gardens, chiefly tomatoes, practically all over the island, as peasants not in the volcanic area had shown their interest and were given due consideration and assistance.

The marketing end of the scheme, in the meantime, was centred around such crops as were available, and, up to the end of the year, the following exports were made:—

65 crates Green Limes to Canada (28 lbs. each).

17 crates Pineapples to Canada and West Indies (40 each).

3½ tons Pumpkins to Bermuda (in Barrels).

41 crates Tomatoes to Canada (20 lbs. each).

All shipments proved successful. The nett prices paid to growers were as follows:—

Green Limes	2/9 per crate	(average)
Pineapples	3d. per fruit	„
Pumpkins	1d. per lb.	„
Tomatoes	1d. per lb.	„

In the report from Brokers, special credit was given for the quality of the pineapples shipped to Canada, where they were declared as being the choicest yet received by the trade.

The pumpkin shipments were well reported on and towards the end of the year Brokers increased their orders for same.

The Tomato crop was only just started and exports in large quantities will go on up to June next year.

Apart from the above start in exporting fruit and vegetables, it is known that by the increased activity there was a readily available supply of fresh vegetables for local consumption and the varieties and quantities of vegetables sold in St. John's showed a significant improvement both in quantity and quality.

Cotton Development Work. Special attention was given to the Peasants' Cotton Industry by the office during the period under review. In the lectures delivered to peasants reference was always made to the adaptability of this crop to the conditions prevailing in the English Harbour, Cades Bay, and High Windward districts, and every encouragement and assistance were given to bring about increased production.

A further step was taken on the Piccadilly Land Settlement to assist tenants with their cultivations by the granting of small loans. In order to bring about better control of the produce from this settlement, arrangements were made by this office with the Antigua Cotton Factory to market the Piccadilly cotton crop in the form of Lint. All peasants will deliver their seed cotton through this office. The seed cotton will then be bulked, ginned and the Lint sold at 1/6 per lb nett Cotton Factory, which must be considered as a definite advance in marketing peasant cotton.

BARBUDA.

The agricultural affairs of the island of Barbuda received the attention of the Peasants Agricultural Office since its inception. After a number of interviews with Barbuda people, while on visits to Antigua, this office interested the people in the present scheme for peasant development, with special reference to the Sea Island Cotton Industry.

The sanction of the Government was obtained to make an effort to resuscitate cotton growing in Barbuda and to this end the Agricultural Instructor was sent over to Barbuda with Cotton Seed for growers, who readily started to clear lands and cultivate their grounds for cotton growing. During the Cotton Inspector's visit lectures were given on the best methods of cultivation and the control of insect pests; the Government keeping a stock of Paris Green for controlling attacks of the Cotton Worms.

In August, 200 lbs. Selected Cotton Seed were distributed to 133 growers, who planted their plots immediately. In spite of abnormally heavy rains the progress of the plots was satisfactory.

Arrangements were made by this office for the marketing of the Seed Cotton produced at the Antigua Cotton Factory. All Barbuda Seed Cotton will be bulked and ginned and paid for at the rate of 1/6 per lb. Lint nett Cotton Factory to all growers in proportion of the quantity of Seed Cotton delivered.

As the market was anxious to know exactly what quality of Lint would be produced in Barbuda an early sample of Seed Cotton was obtained for analysis by this office with the following very satisfactory results:—

Lint Index	.. 6.22 grammes
Seed Weight ..	.. 14.22 grammes
Percent Lint ..	.. 30.9
Lint Length ..	.. 49 millimetres (approx 2 ins)

Lint:— Fine strong and regular. Quite up to the Standard Montserrat Type.

The start made to revive cotton planting in Barbuda is very encouraging and should prove of the greatest monetary value to this island, whose agriculture has fallen to a very low standard during the past few years.

C. A. GOMEZ,

Agricultural Development Officer.

June 4th, 1937.

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